

Gender Equality Network in the European Research Area  
performing in Physics

**Milestone M 4.2**

***Gender and Mobility: Insights into the field of Physics***

April 2018

Work Package 4	Customized GEPs and their implementation in physics
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CERN European Organization for Nuclear Research .....	25
UNIGE University of Geneva.....	27
SNSF Swiss National Science Foundation .....	28
Germany .....	29
KIT Karlsruhe Institute of Technology .....	30
DESY Deutsches Elektronen-Synchrotron – a Research Centre of the Helmholtz Association.....	30

MPG Max-Planck-Society.....	31
Italy .....	31
INFN National Institute for Nuclear Physics .....	31
CNR National Research Council .....	32
France.....	33
CNRS The National Center for Scientific Research .....	33
CEA The French Alternative Energies and Atomic Energy Commission.....	33
Poland.....	34
JU Jagiellonian University .....	34
Netherlands .....	37
NWO The Netherlands Organisation for Scientific Research .....	37
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IAC Instituto de Astrofísica de Canarias.....	38
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## Introduction and Approach

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This report is one of the outcomes of the Horizon 2020 Project GENERA (Gender Equality Network in the European Research Area) and constitutes Milestone M4.2. It is produced under Work Package 4 (WP4) that seeks to develop a more structured and tailored implementation of gender equality measures and instruments into the field of physics.

GENERA brings together 13 key research organizations and higher education institutes in Europe with a scientific focus on physics in Europe to help foster gender equality through customized and evidence-based Gender Equality Plans (GEPs). It is triggered by the well-documented and persistent problem of underrepresentation of women in physics. GENERA originates in the physics community, and thus is a project from physicists for physicists.

Today, scientists are asked to be more mobile than ever before. In some countries scientists are expected to spend some time abroad. Mobility is described as a crucial factor for career development.<sup>1</sup> While international scientific experience offers many career-related benefits, it also can be challenging to make it happen.<sup>2</sup>

### Objective of the report

The focus of this report is to try to better understand some of the push and pull factors affecting scientists' decisions, in particular physicists, with regards to going abroad. The aim is to provide deeper insights into international mobility patterns

- among women and men
- in various career positions
- related to national differences in culture and work environment.

This report is not intended to contribute to the extensive academic debate on analysing mobility patterns or the impact of being mobile. It is a small sample that seeks to consider statements from physicists, from young to senior scientists, with regard to the general assumption that international mobility is crucial for scientific careers. Focused on international mobility in the field of physics, this report aims to give a deeper insight into views and opinions from physicists on the controversial issue of the necessity to be mobile.

### Methodology

Semi-structured interviews with female and male scientists from the field of physics were conducted in summer 2017 by 12 GENERA partners in 8 countries.<sup>3</sup> The reasoning idea behind this study was to

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<sup>1</sup> Sekuła, P. et al., 2018; Appelt, S. et al., 2015

<sup>2</sup> <http://www.sciencemag.org/careers/2011/08/international-mobility>

<sup>3</sup> Based on an interview study methodological guideline prepared by Sekuła, Struzik, Krzaklewska, Ciaputa (2017)

explore the complex sociological portrait of gender equality policies in physics, built upon various standpoints and perspectives of physicists, of both women and men, who have experience of working in research organizations, including universities and non-academic institutes.

In total 82 interviews were conducted: 52 female and 30 male experiences were analysed according to gender-specific topics such as their career paths in physics with particular attention paid to structural, political, organizational and cultural barriers. Further, the identification of factors that enhance the success was analysed.<sup>4</sup>

For this report, a background report prepared by Sekuła, Struzik and Ciaputa (2017) was used and main themes in relation to international mobility are carved out. They are related not only to professional but also personal development, the need of flexibility and terms of career progression. We worked out meaningful statements and comparisons with relevant information found in the current literature. The intention of this report is to give insights on international mobility and influential aspects relating thereto the first-hand feedback from physicists in the European Research Area.

### **Structure of the report**

Chapter 1 describes the understanding of gender and mobility within GENERA. Since there are numbers of dimensions of mobility this report focuses on international mobility. It provides a brief definition of key words and of international mobility only. Facts and figures on the state of the art of scientists' mobility worldwide reveal a number of trends illustrating mobility patterns.

Further on, in chapters 2 and 3 the report focuses on experiences abroad within the field of physics and describes physicists' point of view on mobility as a requirement for scientists or for personal development. Mobility behaviour of women and men is given as a short outline.

Chapter 4 provides information on mobility in the context of being flexible. What does mobility mean for personal circumstances and family life? Apart from this question it reflects the need for flexibility across national/international structures.

Based on different work and life situations, chapter 5 describes to what extent mobility plays a decisive role in the progression of scientific careers. It seeks to explore impact factors and linkages between mobility and career development – based on statements of young and senior scientists.

The final part of the report is a summary of the most important findings. It includes a section of useful information and proven measures related to international mobility in the field of physics. This can be seen as kind of support for preparation for stays abroad or perhaps can be used as inspiration for implementation in research organization structures.

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<sup>4</sup> Sekuła, P. et al., 2018

*“Mobility is a must.”*

*“Mobility is important, but it becomes  
difficult when you are elder [...].”*

*“For me it has been a great experience and  
I would have not wanted to miss it.”*

*“I think that it is harder for women, psychologically.”*

*“It is not a necessity. It is a good experience.”*

# 1. Facts and figures

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A common understanding of terms such as gender and mobility is mandatory in this GMAP. Therefore, definitions are determined and distinguished. They are based on the interview results.<sup>5</sup> Additionally, several figures related to the state of the art on scientists' mobility in Europe<sup>6</sup> in general are given. They show how significant international mobility was in the past and still is today.

## Key definitions

Scientists literally create knowledge and new findings. As part of their research, they develop or improve concepts, theories, models, instruments or methods.<sup>7</sup> Compared to the term researcher, a **scientist** is a person with advanced knowledge of one or more sciences. Basically, a researcher becomes a scientist after having advanced knowledge and experiences in the scientific research.

For the purpose of this study the group of **young scientists** refers to doctoral students and post-docs within the early post-doctoral phase. The early post-doctoral phase comprises scientists in the first three years after the PhD. **Senior scientists** consists of postgraduates in between three to nine years after their PhD as well as the young investigators group leaders. Senior scientists include professors.<sup>8</sup>

**Personal development** is defined as the acquisition of knowledge, qualifications, and experiences to foster one's individual effort and self-assessment. Furthermore, personal development is initiated by the person herself/himself. It is the opposite of the employee's development, which is initiated by an organization.<sup>9</sup>

**Career development** is defined as "the process of learning and improving your skills so that you can do your job better and progress to better jobs"<sup>10</sup>. This process begins with a proactive planning and implementation of action steps towards set career goals.<sup>11</sup> In some cases a mentor or supervisor can be helpful for career development.

On the one hand, **mobility** is defined as the quality or state of being mobile. It is the movement of individuals or groups from place to place, job to job (or from one social or economic level to another). On the other hand, it seems to be impossible to give a clear definition of the term mobility, as it differs according to international interpretations.

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<sup>5</sup> Sekuła, P. et al., 2018

<sup>6</sup> Appelt, S. et al., 2015

<sup>7</sup> DAAD/DZHW, 2016

<sup>8</sup> Sekuła, P. et al., 2018

<sup>9</sup> <http://www.onpulsion.de/lexikon/persoенliche-entwicklung/>

<sup>10</sup> <https://dictionary.cambridge.org/de/worterbuch/englisch/career-development>

<sup>11</sup> <http://www.careers-advice-online.com/what-is-career-development.html>

As we are interested in the mobility behaviour in the field of physics, we defined mobility in relation to academia and research in **mobility experiences abroad**. There are basically transfers or people movements between countries, e.g. international circulation of a country's intellectual resources, globalisation of science impact on actual need for physical mobility. It is about being in a country other than one's own (defined usually by country of birth). This means that we only focus on **international mobility**. It includes all kinds of movement from outside into and out of an organization. One of them is geographical mobility which is seen as a requirement, e.g. spending some time at CERN. It includes international dimensions, outgoing and incoming mobility as well as the reintegration of returnees. Programs for outgoing scientists foster the accumulation of knowledge and good practices abroad. Outgoing mobility's aim is to attract best scientists to improve research activities and strengthen the national community's position.

*"Mobility – and in particular international mobility – of skilled human resources plays an important role in innovation. It contributes to the creation and diffusion of knowledge, particularly tacit knowledge, which is more effectively shared within a common social and geographical context. Coherent and efficient migration regimes help making the most of brain circulation."*<sup>12</sup>

## State of the art on scientists' mobility in Europe

The European Commission fosters mobility through various projects and programmes<sup>13</sup> and encourages students and scientists to go abroad. Studies<sup>14</sup> have shown that mobility is one of the most crucial factors in academia and research. Several programs help scientists to accumulate knowledge and good practices abroad. The international mobility of scientists is about the movement of highly skilled scientists, the movement of highly skilled knowledge workers. There are three well-known types of movement:

'**Brain drain**' describes the potential loss of human capital and knowledge from the source (home country) when scientists go abroad for their research. It can result in long-term absence of the scientist or permanent emigration. The positive aspect of this emigration is the increase of knowledge and human capital in the host country - what one country loses another gain. This phenomenon is called '**brain gain**' for the hosting or receiving country. A third aspect of international mobility is '**brain circulation**'. Highly skilled scientists visit different countries for a defined period of time and then return to their home country. Science and host countries benefit when scientists maintain contacts made during international stays and networks<sup>15</sup> of knowledge and research are expanded.

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<sup>12</sup> OECD (2010) Measuring Innovation: A New Perspective p. 52

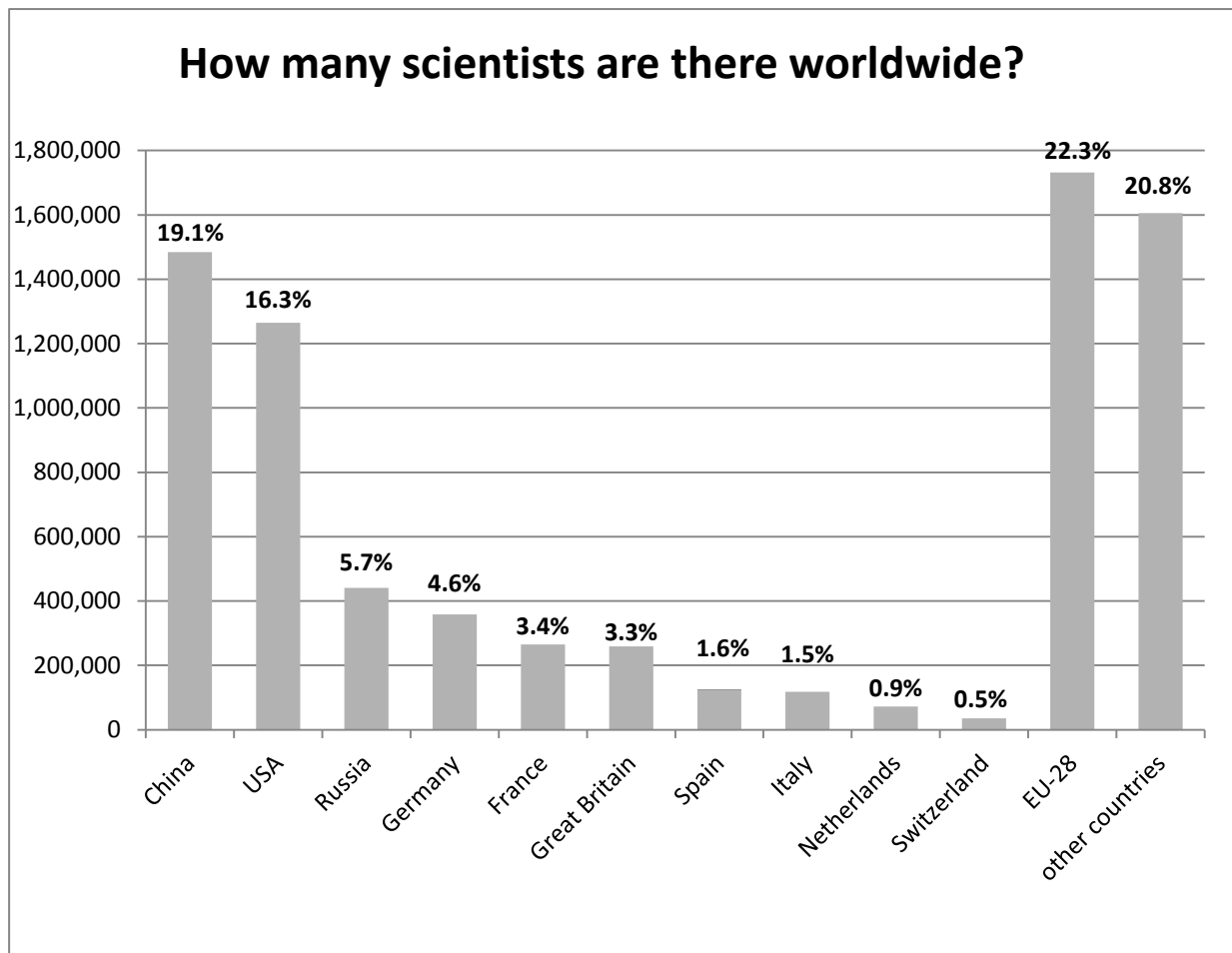
<sup>13</sup> E.g. European Quality Charter for Mobility  
<http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=LEGISSUM:c11085&from=DE>

<sup>14</sup> Appelt, S. et al., 2015; Netz, N./Schirmer, H., 2016; Thorn, K./Holm-Nielsen, L., 2006

<sup>15</sup> Sekuła, P. et al., 2018, p. 52ff



Based on different studies, the following section provides some figures for the state of the art of scientists' mobility in Europe.



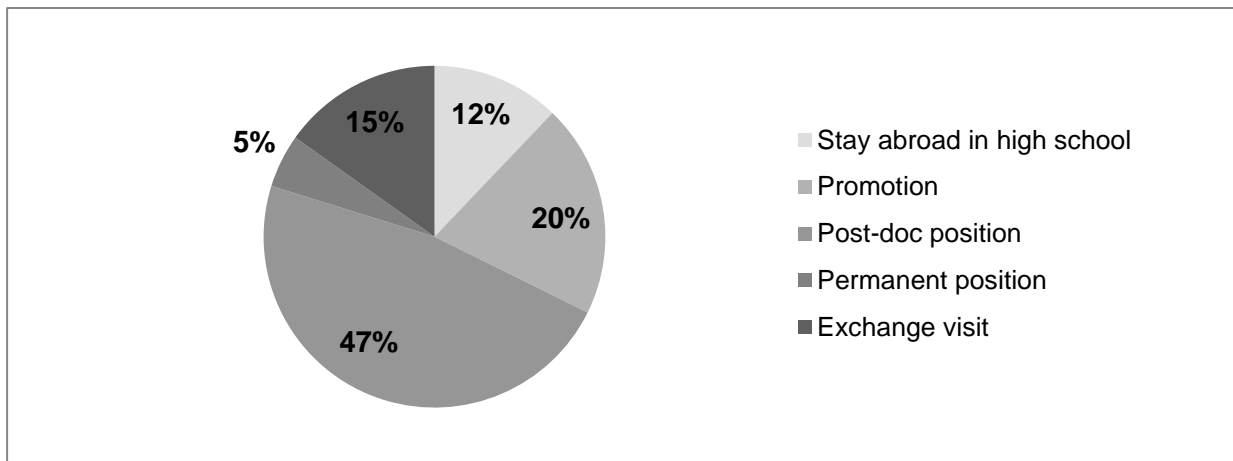
**Figure 1: Scientists in research locations in 2013<sup>16</sup>**

Figure 1 provides an overview on scientists worldwide – not specific to physics. This cut-out gives information on selected countries, with leading research organizations. The largest number of scientists is in China with circa 1.5 million scientists, followed by the USA. The total number of scientists<sup>17</sup> worldwide is approximately 7.8 million.

There are different reasons behind the initial mobility abroad by academics and scientists. It may start with a stay abroad in high school and may end with a permanent position. Figure 2 shows that almost half of the total go abroad to take up a post-doc position. This may be a reason for the high number of young scientists who go abroad.

<sup>16</sup> DAAD/DZHW, 2016

<sup>17</sup> Full-time equivalent: Conversion to full-time equivalents states how many (fictional) full-time posts would result if all part-time posts were consolidated into full-time posts. This conversion provides a higher degree of comparability between countries with different proportions of full- and part-time employment in research; DAAD/DZHW, 2016, p.101



**Figure 2: Reasons for first international mobility**

In comparison to all countries analysed it can be said that the number of scientists in the ERA is particularly high. This means that within Europe there are many of scientists who are able to go abroad.

The comparison between outgoing and incoming mobility shows that particularly the United States of America are very active in the exchange of scientists. Generally outgoing and incoming mobility are almost equal.<sup>18</sup>

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<sup>18</sup> DAAD/DZHW, 2016

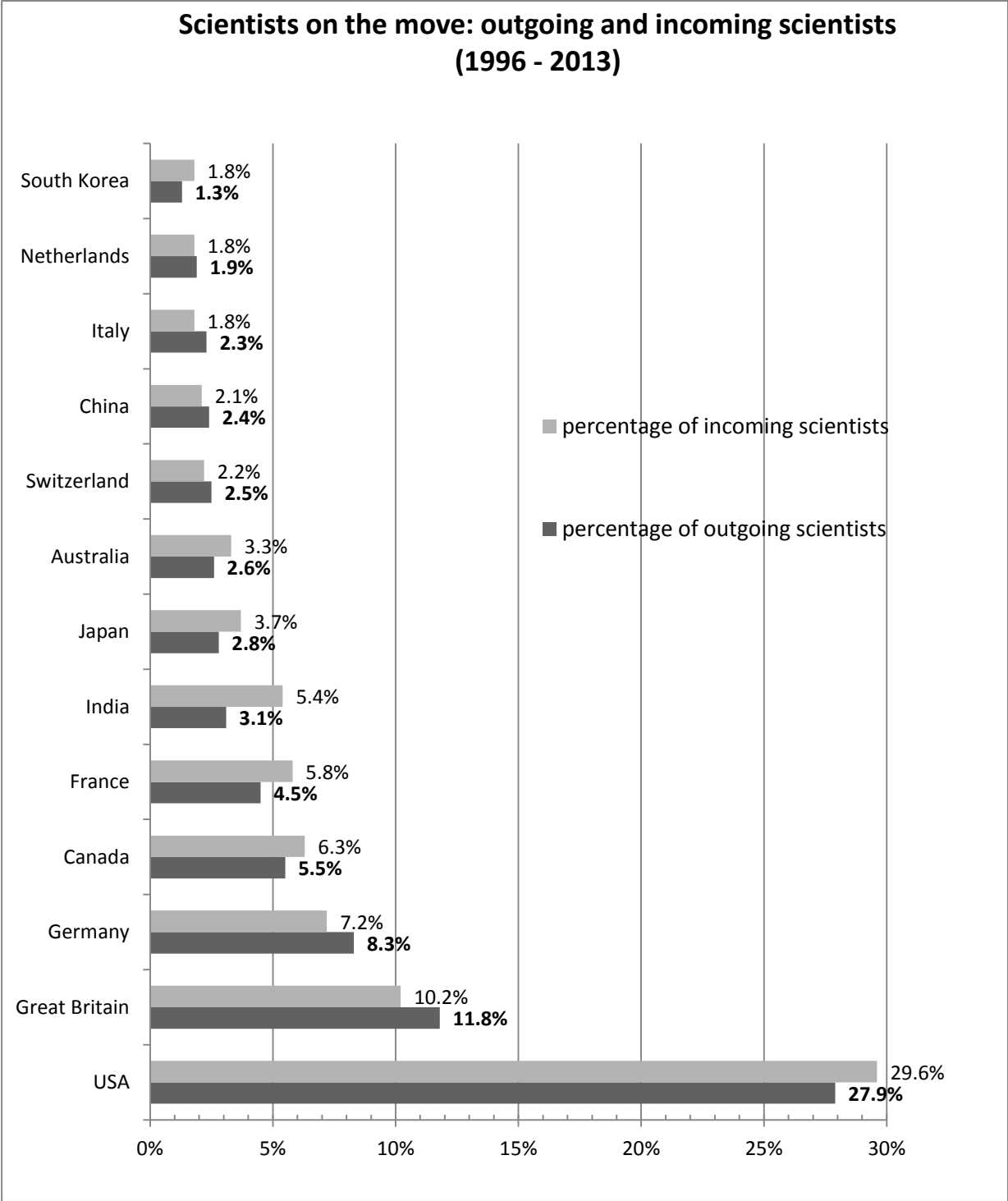


Figure 3: Outgoing and incoming scientists (1996-2013)<sup>19</sup>

<sup>19</sup> DAAD/DZHW, 2016

## 2. Mobility within Physics

### Mobility as a crucial factor

*“It is a field of action where you cannot work by yourself. You need to collaborate, change ideas and experiments.”* (female, senior scientist) In the field of physics, mobility is seen as a core and essential dimension of the discipline itself. Nevertheless there are distinctions within the fields of physics.

*“[...] mobility in physics has always been on a very high level. Among my colleagues there is nobody who would not have spent one year, two years or even three years abroad. [...]”* (male, senior scientist)

When we look more closely, we notice that there are differences within various disciplines as to whether mobility is necessary or not. Some interviewees said that in theoretical physics mobility is not as important as in other sub disciplines such as in experimental physics. This can also be seen as partially true, because it is important to differ between ‘temporary mobility’ and some ‘long period mobility’. The first is when you go abroad for two weeks, one month for example for an experiment and you repeat this several times in one year (this is especially true for high energy physics, but not for physics of optics, or medical physics). The second is when you have to spend a long period abroad staying in another research institute or university, and this is mandatory (almost) for theoreticians. If you are an experimental physicist you have to work with others but you can do a lot of work in your lab with meetings during the year to exchange experience. In experimental physics it is nearly impossible to do research on your own. That is one of the reasons why working together is more and more common. *“[Mobility] is of great importance in my field, I can speak only about my sub discipline - nuclear physics and hadron physics.”* (female, young scientist)

### Need for cooperation

Collaboration is often a result of insufficient financial and material resources needed to work on an experiment. This is documented in literature and was often stated in the interviews.<sup>20</sup>

*“Particularly in [the field of physics] you need to travel because we are more and more working in huge international collaborations, as no one country can pay alone for the experiment we are working on. Look at CERN for example: how could Swiss finance alone such a project?”* (male, senior scientist)

It is necessary to collaborate with other research organizations, because e.g. *“the infrastructure that we need is available in only a dozen or so locations around the world, so it’s a practical aspect that our research can be done in specific centres.”* (female, young scientist)

Another point is that *“it is difficult to build a research group with all the necessary competences and skills within a single research centre. So these groups have to be built so that we all meet together.”* (female, young scientist) This means that there is not enough infrastructure but sometimes also a lack of

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<sup>20</sup> Sekuła, P. et al., 2018

competences or skills of young scientists or research groups. In that way it is possible to find experts from this field if you need to have some information in a specific sub discipline. Therefore it is important to have a good working environment and an entrenched position within physics so that you can use supporting contacts in your network.

*“Scientific community has sense only in case when people contact each other.”* (female, young scientist)

Most scientists mention their benefit from being part of the scientific community and also the imperative nature of mobility in physics, especially in experimental physics. Therefore in the field of physics, mobility can be stated as a crucial factor of being part of the community.

### 3. Mobility and personal development

#### Personal development as a motivation factor

Literature tells us personal development is often mentioned as a motivation factor for international stays<sup>21</sup>. Interviewees, both women and men, also stated that experiences abroad contribute to personal development. They see benefits in knowledge growth, the widening of perspectives and increase in more confidence and independence. Moreover, improvement in technical as well as in methodological competences and improvement in a foreign language can be established.

*“Obviously, it enriches your skills.”* (female, senior scientist) It seems as if mobility is an “[...] occasion for personal and career enrichment.” (female, young scientist) International stays foster one’s career but primarily they affect personal experiences<sup>22</sup>.

*“In a general point of view, it’s always useful for young people to travel. You need to discover new people, new ways of thinking, new cultures. It makes you more confident, more independent.”* (male, senior scientist) *“For me it has been a great experience and I would have not wanted to miss it. [...] For me personally the experience was much more important than the work.”* (male, senior scientist)

#### Women’s value of personal development

The differences between women and men when it comes to personal development in general are not as great as expected. Both, women and men mentioned that being mobile advances not only professional but also personal progress. *“You need to have mobility; otherwise you won’t get a position. It is also important for your image.”* (female, senior scientist)

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<sup>21</sup> Netz, N./Schirmer, H., 2016, p. 11

<sup>22</sup> Minssen, H., 2009

Some statements given by male scientists have had a restrained character with regard to their personal experiences. Female scientists spoke more often about increasing competencies and learning new skills. They tended to be more open in terms of speaking about personal development than their male counterparts. Most of the female scientists stated that they felt an increase in self-confidence while they were abroad. *“You gain [thanks to mobility] this kind of self-confidence that you are recognized not only here at home, but also that you are important for someone abroad, you feel appreciated.”* (female, senior scientist)

## Cooperation fosters intercultural skills

An important aspect is the development of intercultural ‘soft’ skills. This effect was correlated with cooperation in international teams. *“To collaborate with other researchers enriches you, in my opinion foreign experiences are very important because [they] allow you to see things from another perspective.”* (female, senior scientist)

*“It’s a good chance to exchange ideas. When you go to visit different laboratories, meet new physicists, it’s the occasion to enlarge your knowledge and research.”* (female, young scientist)

By working in these international teams specific networks can be assembled and extended. However, not only the network is helpful, but also the contact to experts in one’s specific field. This is underlined by the statement *“It is crucial and good for self-esteem to create networks; social and professional skills become better.”* (female, senior scientist) On the one hand personal and intercultural skills can be fostered e.g. by participating in workshops or talking at international conferences. *“You cannot perform if you don’t go to conferences, workshops. You need to be part of the culture, otherwise you cannot get it.”* (male, young scientist) On the other hand, these meetings and international cooperation help to enlarge a network you can use afterwards.

## 4. Mobility = Flexibility?

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Although most of the interviewees confirm the importance of being mobile, mobility also appears to be a challenge. In the interviews national and international differences in language, culture and work environment were mentioned. It seems that short-term mobility is more flexible than long-term mobility. This means that it is easier to coordinate one's professional and private life if the absence is only for a few weeks than some half a year or more.

Different sub-disciplines within physics require different levels of flexibility. For example, there is a great amount of cooperation and exchange in experimental physics between the different research institutions. Thus, for progression you have to have cooperation and collaboration with other research institutions, because you might have a lack of equipment at your organization.

As some authors<sup>23</sup> describe, the main obstacle in international mobility is the lack of financial resources. Studies confirm: 56% of scientists do not go abroad because of a lack of financial resources for research or for stays abroad.<sup>24</sup> Our interview results also confirm these findings.

*“When it comes to financial aspects of travelling, you have to fight for the money because there are insufficient resources for travelling. One has to gather money on her own. And it depends on the luck [...]”* (female, senior scientist)

While scientists are willing and able to go abroad there are many other barriers beyond financing of international mobility. There are organisational and bureaucratic problems which scientists have before or while moving to another country. These logistical problems hinder 52% of scientists from going abroad.<sup>25</sup> *“There are terrible administrative obstacles in everything.”* (female, senior scientist) The list goes from frequent commitments in teaching, research and administration<sup>26</sup> through language problems to lack of support in planning and implementation.

### Social relations

Another obstacle which can be found in literature as well as in the results from the interviews is social relations<sup>27</sup>. This assumption is based on different studies, which show that personal/family reasons may hinder scientists ability to be internationally mobile. With a percentage of 67% the reconciliation of

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<sup>23</sup> Sekuła, P. et al., 2018; Netz, N./Schirmer, H., 2016

<sup>24</sup> DAAD/DZHW, 2016

<sup>25</sup> DAAD/DZHW, 2016

<sup>26</sup> Netz, N./Schirmer, H., 2016, p. 16

<sup>27</sup> Sekuła, P. et al., 2018; Netz N./Schirmer, H., 2016

professional and private life is the most important obstacle to mobility for scientists from EU countries.<sup>28</sup>  
This raises an interesting question - whether being mobile is the same as being flexible?

Mobility has an impact on the individual and on the partner/family as well. “[...] *maybe one of the biggest problems in science [is] that you have to be extremely flexible including everyone around you. Well, that means if you have family, everyone needs to be flexible as well.*” (male, young scientist)

There are difficulties with the transparency of one’s career path and the uncertainty of what will happen in the future. Different stages of life require different strategies to move forward in one’s career and life. Starting a family can be definitely a barrier for mobility within the early phases of an academic career.

“*You have to be competing and moving constantly in the period when people normally think about forming a family.*” (male, senior scientist) Contrary to our expectations, this view is shared by female and male scientists alike. The preference for raising a family has to be taken into consideration and is related to the decision to leave the partner behind and start a new life abroad.

“*The other point is for maintaining a distant relationship: of course it’s difficult when you have to work in different countries than your partner.*” (female, young scientist)

Key factors are reciprocal understanding, the knowledge of the requirements and maybe the willingness to follow. But the main problem in this case is to find a place to work together.

“*And the partner also plays a big role in it.*” (male, young scientist)

“*[...] so from my personal experience, it is not a problem for me but, [...] let’s say, for instance for my wife, it is an important topic every time of course, because [...] it is not easy to start from scratch every time, [...] that is expected in our profession, but, [...] for the other people, the family or something that is of course, [...] not necessarily practical.*” (male, senior scientist)

“*Mobility for long periods is challenging from a human point of view. In my offsite experience, it would have been even more difficult because it would have led me away from my family.*” (female, young scientist)

The consequences of the decision are shown above in various obstacles with regard to reconciliation of professional and private life. “*It is always hard [to reconcile work and family life] but it is easier for sure when having flexible working hours, for sure it is easier.*” (female, senior scientist) Similar results from the interviews show that dual careers in academia would make it easier to reconcile work and private life especially when being mobile. One male scientist stated that it would have helped to have the opportunity for dual careers, but it was not possible for him and his partner.

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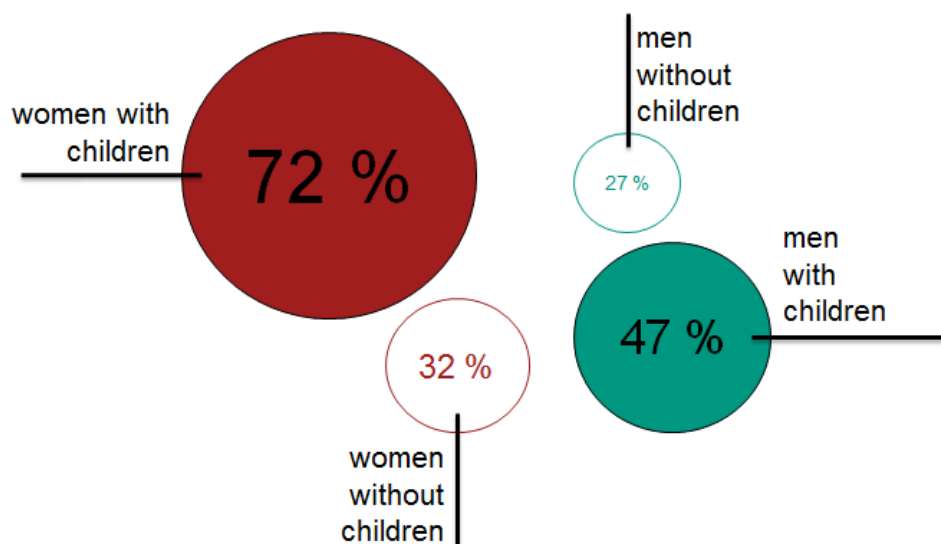
<sup>28</sup> Friesenhahn, I./Beaudry, C., 2014



## Mobility and family

Netz and Schirmer<sup>29</sup> describe that social ties can complicate career development and affect one's work-life balance. That is the most obvious aspect we observed in the interviews:

*“Before I used to move a lot, I really enjoyed it: conferences, workshops, colloquium [...] every time I had the opportunity to travel, I moved. Now, with a baby, of course it's more complicated. I need to check with my companion if he can take care of our child while I'm away, so I try to leave only when it's really necessary.”* (female, senior scientist) This statement is also confirmed in Figure 4, which shows the percentage of women and men with or without children who considered the balance of professional and private life as an obstacle. *“Now I'm older and with a family implicated in my professional life, I would hesitate to leave this country for another one. My children are of course an important point in this decision. Even if I'm not always satisfied with the situation in the laboratory, I don't want to move them in the middle of the scholar year or to a country they don't understand language.”* (male, senior scientist)



**Figure 4: Percentage of scientists who considered reconciliation of professional and private life as an obstacle for international mobility<sup>30</sup>**

A large majority of scientists indicated that being mobile is more difficult when you have to reconcile job and private life, and in a concrete manner with children. *“My family influenced my decisions on travelling abroad [...]”* (male, senior scientist) Scientists without children stated fewer obstacles for international mobility. There is a significant difference of perceptions between female and male

<sup>29</sup> Netz, N./Schirmer, H., 2016, p. 15

<sup>30</sup> Friesenhahn, I./Beaudry, C., 2014; <https://www.humboldt-foundation.de/web/kosmos-cover-story-105-1.html>

scientists. The percentage of women - independent of with or without children - is markedly higher than expected. So, figure 4 shows that 72% of women with children need to deal with more obstacles to be mobile than men (only 47%). In some cases that's "*the reason why some women, even though they have talents, stop.*" (female, senior scientist) The numbers of scientists without children who perceive reconciliation of private life and international mobility is relatively balanced (about 30%).

Taking the decision to be mobile, to leave the family, has always an effect. One interviewed woman described her international stay as a "personal sacrifice", because she had a little baby at home while she was yet breastfeeding. "*Such a dramatic picture that I can tell you is that at one point in my work the analysis [I performed] was completely closed and I wanted to consult my [...] mentor, such direct supervisor, I wanted to present him [the results] in detail and more deepened way than by email. I decided to go to [abroad], it was a 3-day trip, so I wasn't at home for 3 days, and that was the period when I breastfed and it was probably the most dramatic period of my life. As I returned, the baby literally jumped on me. So these dramatic memories of those 3 days, those swollen breasts and that baby on the other hand at home, it was pretty dramatic.*" (female, young scientist)

In general it is necessary to consider that not only the scientist has to be mobile but also his/her family has to be. "*I need to check with my companion if he can take care of our child while I'm away, so I try to leave only when it's really necessary.*" (female, senior scientist)

*"I believe that is [...] maybe one of the biggest problems in science that you have to be extremely flexible including everyone around you. Well, that means if you have a family, everyone needs to be flexible as well."* (male, young scientist)

In summary it can be said that reconciliation of private and professional life in science and particularly in physics requires a special strategy before leaving for an international trip. Most times "*it depends on what phase of your life [you are in].*" (female, young scientist)

## 5. Mobility: career progression or regression?

### Push and pull factors for mobility

Figures 5 and 6, which show reasons and obstacles for international mobility, are for science in general, but the interview results used for this report agree with them. The general results are also reflected in literature and further studies.<sup>31</sup> As these are the most important reasons and obstacles to mobility of scientists it is possible to transfer these findings to the field of physics. Nevertheless, it must be noted that the field of physics is diverse and unique, and therefore has to be seen as a particular field of science.

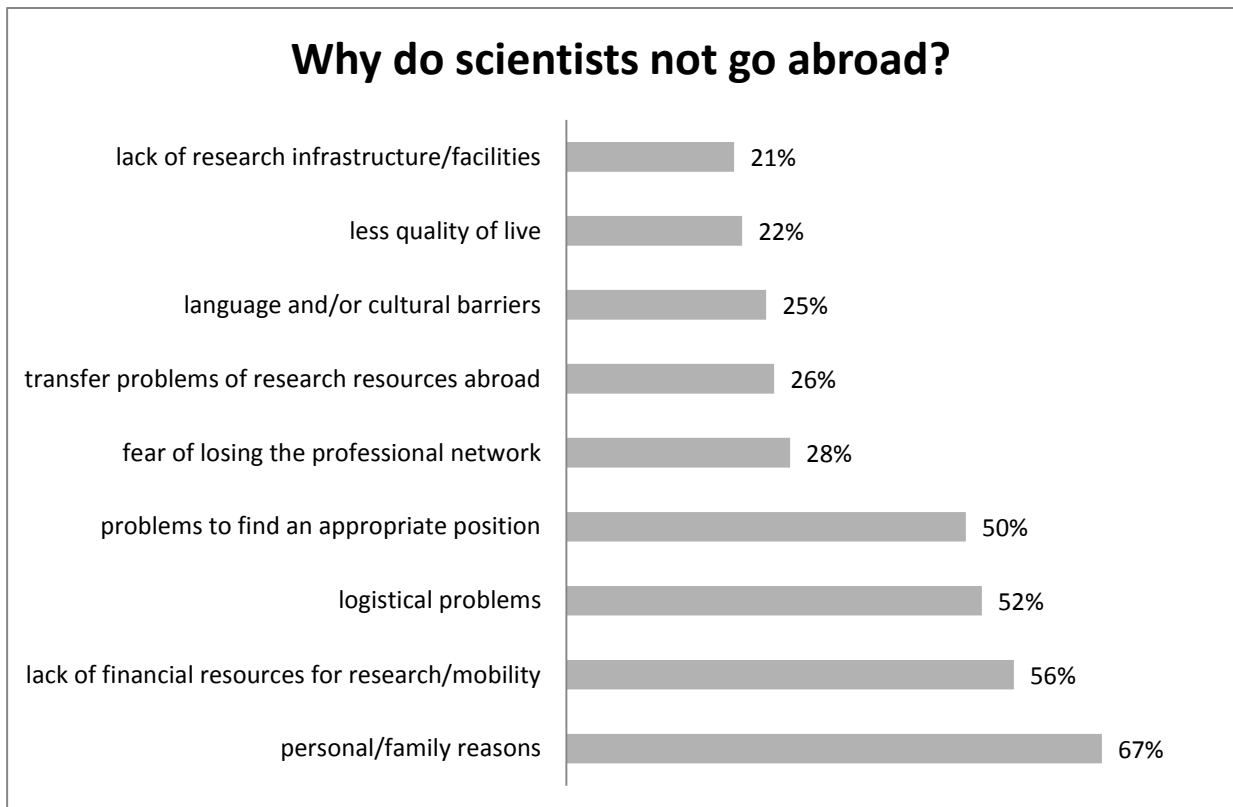


Figure 5: Reasons why scientists go abroad<sup>32</sup>

*“Without moving you probably won't get a job. But also it's how you meet the other people in your field. You get to know other ways of doing science. The atmosphere is different, the people are different. I think it is important to see that.”* (female, senior scientist)

<sup>31</sup> Appelt, S. et al., 2015; Netz, N./Schirmer, H., 2016; Thorn, K./Holm-Nielsen, L., 2006

<sup>32</sup> DAAD/DZHW, 2016



**Figure 6: Obstacles why scientists not go abroad<sup>33</sup>**

Mobility within a country is less visible and therefore less often considered as crucial, yet it offers different perspectives and working structures through the experience of being in different research institutions. “[...] you could change within the country as well and you would still see something different, so as long as it is a little different in terms of topic.” (female, young scientist) Compared to national (internal) mobility, international mobility is often declared as a crucial factor for career development. Its importance is typically linked to early career stages.

### Career progression for young scientists

Physical mobility allows, especially in the narratives of younger scientists (also representing emerging subfields of physics like astrophysics, medical physics, engineering physics), the exchange of knowledge, new perspectives, experiences in and methods of conducting research. Young scholars and scientists are obliged to travel and cooperate closely with foreign research institutions and in international teams.<sup>34</sup> “Yes, [...], you do not have to study somewhere else, but you have to, so that is what colleagues told me, that you have to have experiences abroad at some point. [...]” (female, young scientist) Being mobile and having experience of international cooperation is also positively evaluated

<sup>33</sup> DAAD/DZHW, 2016

<sup>34</sup> Sekuła, P. et al., 2018

when applying for research grants. *“It is important because it makes it a lot easier to apply for grants and for funding if you were more mobile.”* (female, young scientist)

Furthermore, mobility should be considered as one of the elements which constitute excellence. *“For career progression [it] is mandatory to be mobile, connected with other people from your field.”* (female, young scientist) However, some young scientists notice that mobility “counts for” career only after receiving their PhD (e.g. in the Netherlands they are supposed to spend a year or more abroad during post doc time). Such an understanding of mobility is reflected as well in the underlying significance of close collaboration with foreign and international research organizations.

*“When it comes to mobility, if you don’t have any good excuse, lack of mobility would be frowned upon. Only if somebody has phenomenal publications and stays at home, that’s fine. [...] But if somebody is located within 66% group, close to the average, then it’s better if he or she travels, because mobility is good for one’s scientific, global experience, it brings new knowledge [...].”* (male, young scientist)

In general, international mobility especially as a young scientist, can be seen as progression with regard to widening one’s own network and personal development. Moreover knowing various scientific communities and different cultures is quite important for research. *“It is important to experience different dynamics and manners of conducting research.”* (male, senior scientist)

*“[...] I decided I had to move in order to continue with my career. In spite of the fact that my partner was here, I spent several years abroad. (...) It was a personal sacrifice but it was very positive because I worked and published a lot.”* (female, young scientist)

## Mobility as career regression

In terms of returning home, mobility is sometimes seen from both, women and men, young and senior scientists as a disadvantage. *“It is necessary on the CV. But to be honest, is it really necessary in the point of view of how much you can learn, I have my doubt... I mean, of course you learn different things in different places. But based on my experience on my 2 years post-doc, basically you arrive in a place, you have to adapt, and the time you realize you are there you are already gone.”* (female, young scientist)

When scientists are abroad it is not sure that they can go back to their institution and get their prior job back. *“[...] getting back from an external period would have been very difficult in terms of getting again the position [...].”* (male, senior scientist) Additionally, it is more difficult when you already have reached a high level position and have to move to another research organization, possibly in another country. *“In my case, going abroad could be downgrading.[...].”* (female, young scientist) *“Mobility is important, but it becomes difficult when you are elder, when you have some positions.”* (female, senior scientist)

Nonetheless, mobility does not only mean regression for a scientist’s career, it can also mean career progression. Therefore it should be considered what the individual focus is. In summary, mobility fosters

career development especially with regard to personal development as well as to individual qualification<sup>35</sup>. But in some cases it also includes some negative aspects e.g. upon return.

*“It’s not a necessity. It’s a good experience, but it has maybe to stay time-limited. For me my post-doc experience was really wonderful, my partner followed me even though he didn’t have a job, it was our couple project to live somewhere else for 2 years. But if it had gone on more and more years, it would probably have become a problem. When I see people who are doing their 7th post-doc in a 7th different country... I don’t know how they can live like this; in my opinion I would have left the job if I had to work in such terrible conditions.”* (female, senior scientist) *“Mobility for short periods is fundamental and it is occasion for personal and career enrichment.”* (female, young scientist)

Summarized, a number of factors have to be taken into account when considering whether international mobility advances or hinders career progression. The advantage of international mobility for career progression depends upon, among other factors, the field of specialisation in physics and the current position occupied.

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<sup>35</sup> Minssen, H., 2009; Netz, N./Schirmer, H., 2016

## 6. Conclusions

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This report has summarized theories and empirical evidence on mobility patterns of female and male scientists. It has done so from three perspectives that were distinguished as mobility and private life, mobility as a synonym of being flexible and the common/different view of mobility and its impact on career development.

Common reasons for scientists to travel are: gaining better career perspectives, participating in outstanding research groups, and potentially working at an institution with a good reputation and with available equipment. Yet, the most frequent reason for a scientist to travel was to extend their international network.<sup>36</sup> The aspect of networking is of particular importance for the interviewed scientists.

International mobility is associated with a lot of preparatory organization in professional and private life. Moreover, tendencies are observed that mobility for female scientists is harder than for males. Furthermore the female interviewees were opener than the males which (in some cases) did not mention personal obstacles to be mobile.

Main obstacles of being mobile are organizational reasons and a lack of financial resources for research or for being internationally mobile.<sup>37</sup> Moreover language and/or cultural barriers as well as a lack of support in the home and the host country were identified constraints.

Concerning the relation between the career position and a career progression or regression, it seems that in experimental physics it is more important to be mobile than in theoretical physics. Moreover mobility is a positive factor especially for young scientists. As a young scientist it is important to widen one's professional network, establish contacts to colleagues/experts in the research field, get to know the scientific community and gain personal development. On the other hand it is hard as a new scientist to step into the (international) scientific community.

For senior scientists it is easier to travel because they already have various connections. But a few disadvantages in personal and career development have been determined. Returning home in general can be seen as problematic. It is hard to return back on the same job or the same level in one's home country.

As seen in the sections above, mobility depends on one's situation in life, the professional circumstances and the work environment. Especially within different sub disciplines of physics there are different opinions on mobility. In some cases it actually can have negative outcomes.

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<sup>36</sup> DAAD/DZHW, 2016

<sup>37</sup> Appelt, S. et al., 2015; Netz, N./Schirmer, H., 2016

Furthermore from a physicist's point of view – different factors foster and hinder mobility. It can, however, not yet be ascertained, to what extent international mobility can be seen as progression or regression of one's scientific career.

At least this report can recommend mobility in terms of knowledge transfer (drain/gain) and knowledge sharing (networking, collaboration) as an important factor within science and also within physics. Both male and female scientists perceive personal as well as professional development connected with mobility as a progress. Especially for young scientists, travelling is helpful to improve one's image and join the scientific community. Nevertheless, mobility requires a lot of organizational preparation. One's situation in life, one's professional position and the work environment should be considered. An equal position after one's return is not guaranteed, which can be seen as problematic in some career stages.

Summarized, the results of the interviews indicate that being mobile in physics remains necessary. All stays abroad have to be planned and prepared individually and tailored to specific circumstances of the scientists.

### **Tailored support and supervisor**

The greatest support that was mentioned in the interviews is a central contact / service unit where scientists can come to ask for information. Reasons for this are the very specific needs of every single scientist.

To foster mobility of scientists and in our research interest physicists (female *and* male), there have to be tailored measures and programmes to support them in their individually private and professional stage of life. Studies as well as our interview results have shown that there are specific needs for financial support (e.g. grants, fellowships), organizational support (e.g. dual career service, counselling service), and family support (e.g. childcare) and other general support (e.g. finding accommodation in the host country).

Especially for young scientists, it is a great support to have a supervisor before or when going abroad. On the one hand they can motivate their scientists to go abroad and give them support to better cope with some obstacles. On the other hand they can provide their personal network to find the way around much better (e.g. contact person in the host country).

For a more thorough and complete understanding of mobility patterns related to gender, it is essential to continue and deepen these findings, by including more views and experiences from scientists in the physics field in the scope of an identification of more indicators for being mobile within the physics community in the scope of career progression or regression. Even for different career steps it is important to know about the specific needs they have when they go abroad. Further a study is required on key factors physicists consider when deciding whether or not to go abroad to concrete the general findings from existing studies. The question to be answered is: In which career phase mobility can be seen as a push factor and a career progression? Specific requirements need to be determined and steps need to be taken in individual support of scientists.



## 7. Useful information & actions taken in the field of physics

In order to support scientists within this report, there is useful information that provides financial and organisational support. Below, you will find information about various sides, useful if you want to go abroad. Of course, this information is not exhaustive, but specified to physics.

Title	Notes	Link
Euraxess	<ul style="list-style-type: none"> <li>▪ information and support services regarding scientists' mobility, career development, and scientific collaboration</li> <li>▪ search tool for job adverts; indications: current position / request</li> <li>▪ further information and links to various topics</li> </ul>	<a href="https://euraxess.ec.europa.eu/">https://euraxess.ec.europa.eu/</a>
Funding search	<ul style="list-style-type: none"> <li>▪ research tool for funding / fellowships</li> <li>▪ indicators: kind of support, funding, field of science</li> </ul>	<a href="https://euraxess.ec.europa.eu/funding/search">https://euraxess.ec.europa.eu/funding/search</a>
Charter and Code	<ul style="list-style-type: none"> <li>▪ charter: comprises general principles and requirements, responsibilities, rights of scientists as well as of research and funding institutions</li> <li>▪ code of conduct: secures equal treatment of all scientists in Europe and transparent recruitment</li> </ul>	<a href="https://euraxess.ec.europa.eu/jobs/charter">https://euraxess.ec.europa.eu/jobs/charter</a>
Scientific Visa	<ul style="list-style-type: none"> <li>▪ facilitates the procedure for the purpose of scientific research</li> <li>▪ referred to non-European countries in order to stay for more than 3 months or for entry of less than 3 months</li> </ul>	<a href="https://euraxess.ec.europa.eu/information/content/europe/scientific-visa-what-it-and-who-can-benefit-it">https://euraxess.ec.europa.eu/information/content/europe/scientific-visa-what-it-and-who-can-benefit-it</a>
Marie curie schemes	<ul style="list-style-type: none"> <li>▪ generous research funding for scientists (all stages of their career)</li> <li>▪ various funding schemes and requirements</li> <li>▪ further information about possibilities to go abroad</li> </ul>	<a href="https://ec.europa.eu/research/mariecurieactions/">https://ec.europa.eu/research/mariecurieactions/</a>
Research office	<ul style="list-style-type: none"> <li>▪ fellowships and mobility funding</li> <li>▪ for PhDs, Postdocs and for short-term opportunities</li> </ul>	<a href="https://research-office.epfl.ch/fellowship-mobility-funding">https://research-office.epfl.ch/fellowship-mobility-funding</a>

Marie Skłodowska-Curie Actions Individual Fellowship	<ul style="list-style-type: none"> <li>▪ guide for applicants</li> <li>▪ overview about individual fellowships</li> </ul>	<a href="http://ec.europa.eu/research/participants/data/ref/h2020/other/guides_for_applicants/h2020-guide-appl-msca-if_en.pdf">http://ec.europa.eu/research/participants/data/ref/h2020/other/guides_for_applicants/h2020-guide-appl-msca-if_en.pdf</a>
Cern – Fellowship programme	<ul style="list-style-type: none"> <li>▪ addressed to graduates from universities or higher technical institutes</li> <li>▪ fellowships for different career levels</li> </ul>	<a href="http://jobs.web.cern.ch/join-us/fellowship-programme">http://jobs.web.cern.ch/join-us/fellowship-programme</a>
Job resources	<ul style="list-style-type: none"> <li>▪ useful links for diverse job resources in the field of physics</li> </ul>	<a href="http://mpowir.org/resources/job-resources/">http://mpowir.org/resources/job-resources/</a>
Met-jobs Meteorological and related jobs	<ul style="list-style-type: none"> <li>▪ regular (free) mailings of job adverts in diverse fields of physics</li> <li>▪ advertise job openings</li> </ul>	<a href="https://www.lists.rdg.ac.uk/mailman/listinfo/met-jobs">https://www.lists.rdg.ac.uk/mailman/listinfo/met-jobs</a>

As stated above, there have to be measures and programmes, which are specifically customized for physicists who want to go abroad. On the one hand, there have to be opportunities for outgoing scientists. On the other hand, there have to be services for hosts. What they have in common: they have to be tailored to the specific needs of the scientist.

Below, there are current information from GENERA partners and associates, which provide proven measures and programmes in various research organizations. Additionally, there is information about national and organizational obligations. In some countries and organizations there are agreements or similar to foster mobility in the research area.

## Switzerland

### Legal obligations in Switzerland: no

Not applicable, e.g. CERN is an intergovernmental organisation and by definition they recruit scientists from its 22 member states.

### CERN European Organization for Nuclear Research

#### Organizational obligations CERN: no

Not applicable - except for some EU projects for doctoral students.

From a mobility perspective, CERN provides support to geographical relocation as well as parenthood, which can become complicated for families expatriated far from their social and family environment.

#### Support to parenthood

- **Maternity leave:** 100% remunerated, up to 23 weeks, with a minimum of 16 weeks.
- **Paternity leave:** 100% remunerated, gender neutral, up to 3 weeks, minimum 2 weeks.

- **Parental leave:** 4 months, unremunerated but with family benefits maintained and health insurance fully funded by CERN.
- **Adoption leave:** 100% remunerated, 15 weeks.
- **Other family-related leave:** 7 days of remunerated leave in the event of illness of close relative [this leave is increased by five calendar days for single fathers or mothers in the case of serious illness of a dependent child]; 3 days of leave for family reasons such as marriage, loss of spouse, child or own parents; 1 day of leave for loss of brother, sister, parent-in law or step-parent.
- **Part-time work:** Guaranteed access to part-time work [80%-100%] for 6 months in 12 months following birth or adoption of a child. Otherwise part-time is possible if required and compatible with the service needs [50%-100%].
- **Dynamic leave scheme:** in addition to a 6-week annual leave, the possibility to buy 22 max additional leave days to be used during the year or accumulated and used for specific reasons, such as caring for a close relative suffering from a serious illness, or for professional development.
- **Child Care Facilities:** CERN offers on-site facilities for children between ages of 4 months and 6 years. Furthermore, following the agreement between CERN and 2 local childcare centers, places are reserved in local structures.

### Support to geographical relocation

- **Installation / reinstallation Indemnity:** a lump sum to cover the costs associated with relocation to and from CERN. The amount is based on family situation but irrespective of whether the spouse relocates with the new employee, hence possibly covering cost associated with commuting.
- **Travel expenses to and from CERN at taking up appointment / ending contract – Associated removal expenses:** the amounts are also based on family situation but irrespective of whether the family relocates with the new employee, hence possibly covering cost associated with commuting.
- **Home leave:** to help maintain ties with home stations, funding of annual trip back to the home country, also covered for family members.
- **Induction process:** to integrate employees in their work environment (process run by HR and the direct work environment), and their family into their life-environment (Family welcome function run by various services).
- **Dual Careers:**
  - No restrictions are in place at CERN with regard to dual hiring of spouses.
  - Membership to International Dual Career Network, to facilitate spouses' job search.
  - Possibility for spouses to obtain a Swiss work permit (under specific conditions), to attend language courses at CERN, as well as to join the CERN clubs, which offer an array of sports, leisure and cultural activities.

## Support to social life

- **Social Affairs Service:** CERN provides members of personnel as well as members of their families with this drop-in service, which offers advice and support in a wide variety of circumstances (professional and private) and guarantees confidentiality. The Service handles requests concerning many different topics, including the education system in Switzerland and France, the support to children with disabilities, employment possibilities for spouses of members of personnel and many more.
- **Clubs:** a diversity of on-site leisure, culture and sport clubs also open to the local communities (outside CERN) to create social networks.

### Further information on the above is available, respectively, at:

- Family-related leave and Child-care facilities:  
<http://cds.cern.ch/record/2194543/files/CERN-Brochure-2016-963-Eng.pdf>
- Support structures for spouses and partners:  
<http://diversity.web.cern.ch/spousesupport>
- Social Affairs Service:  
<https://hr-dep.web.cern.ch/social/social-affairs-service>

## UNIGE University of Geneva

### Organizational obligations UNIGE: no

In response to very few women employed at UniGE taking maternity leave the UniGE Gender Equality Plan proposes the following actions:

- Modifications to the regulations possibly including 100% reimbursement for maternity leave and/or funds for researchers unable to work in the lab due to pregnancy.
- Make available information also at human resources for possible available assistance and family management solutions including a brochure 'Parents, suivez le guide!'
- Provide social structures to facilitate parents to organize between them care of children within a network.

UniGe Gender Equality Plan contains the following policies in place to welcome researchers changing career path or returning from a break as well as those in dual careers:

- Follow the welcome and assistance available at the Welcome centre (<https://www.unige.ch/collaborateurs2/nouveaux/services/welcomecenter/>) specific to those in dual career or to help finding a new changing career path for partners of new employee.
- Continue the Saturday meetings of parents and children organised by the welcome centre.
- Follow the workshops, which aid people in dual careers to integrate in the networks and available activities.

- Organise a colloquia with the theme of mobility and methods to make the necessary travel during their career less constraining and more equal in terms of gender, social origins and financial resources.
- The Welcome Centre should advise spouses on how to take actions to find jobs in the new town, employees with kids about how to find childcare in Geneva which is a real issue and so on as you can see in <http://www.welc.ch>.

## SNSF Swiss National Science Foundation

### Organizational obligations SNSF: no

The SNSF views mobility as an essential element of an academic career. There are mobility requirements for most career instruments except PRIMA, the career funding scheme for excellent women researchers. SNSF mobility grants specifically foster mobility.

### SNSF mobility grants: **Doc.Mobility, EarlyPostdoc.Mobility, Postdoc.Mobility**

- Mobility fellowships are designed for doctoral students (Doc.Mobility) and postdocs (EarlyPostdoc.Mobility, Postdoc.Mobility) who wish to enhance their scientific profile by working at a research institution abroad. The fellowships include a grant towards living costs, a flat-rate for travel expenses and, if justified, a contribution towards research and conference costs as well as matriculation fees. A higher amount may be paid if the grantee is accompanied by members of his or her family (partner, children). These fellowships are awarded for 6 to 24 months, the actual span depending on the scheme. In addition, Postdoc.Mobility grantees can apply for a return grant to finance their initial period of research after returning to Switzerland. The return grant includes a salary and social security contributions and is awarded for 3 to 12 months.

### Supplementary measures:

- **Mobility grants in projects:** aimed at doctoral students who wish to improve their scientific profile by going abroad while being employed in an ongoing SNSF research project. A mobility grant can cover travel and living costs as well as fees for conferences and workshops of up to CHF 20,000. It is awarded for six to twelve months. A higher amount may be paid if the doctoral student is accompanied abroad by members of his or her family (partner, children).
- **Flexibility Grant:** aimed at postdocs and doctoral students who have to look after children at an important stage in their career and are therefore in need of more flexibility. The Flexibility Grant offers researchers two options to balance their professional and private lives: on the one hand, it can provide funding to help cover the external child care costs charged to the researcher. On the other hand, it can be used to help finance the salary of a support person, allowing the grantee to reduce his/her work quota. The two measures can also be combined.

- **Gender equality grant:** aimed at young women researchers funded by the SNSF. It offers them additional individualised and flexible support for their career development. An eligible person receives CHF 1000 per 12 months' approved project running time. The grant may be used to finance career support measures, such as mentoring, coaching, conferences and workshops (incl. travel costs), but does not cover family support measures.

For further information on gender equality in research funding at the SNSF see:

<http://www.snf.ch/en/funding/directaccess/gender-equality/Pages/default.aspx#>

## Germany

**Legal obligations in Germany:** no, not in this regard. There are lot of laws relating with internationality and migration.

The German Residence Act (Aufenthaltsgesetz) provides for three ways in which scientists from third countries can obtain a legal residence title in Germany while carrying out their research. If you wish to work at a German research organisation only, you may be able to be issued with a residence title for research purposes. This also applies if you will be researching in other EU Member States as well as at the German organisation, but will be spending most of your overall EU residence period in Germany.

Should most of your residence period be spent in another EU Member State, you will need to apply for a residence title there under Directive 2016/801/EU. This residence title will permit you to research at a German research organisation for a specific period (You will find details further below at "Short-term mobility", as well as at "Residence permits for mobile researchers").

Further information for scientists:

<http://www.bamf.de/EN/Migration/Arbeiten/BuergerDrittstaat/Forscher/forscher-node.html>

Summing up, there are no general obligations for international mobility in Germany. But some international master programs and Graduate schools ask their students to go abroad for some time.

Speaking about Germany in general, there are many public organizations and programs which support the international mobility of scientists.

- DAAD is one of the biggest organization in Germany offering funding to scientists  
<https://www.daad.de/ausland/studieren/stipendium/de/22346-postdoctoral-researchers-international-mobility-experience/>
- DFG offers also information and counselling service.  
[http://www.dfg.de/en/research\\_funding/principles\\_dfg\\_funding/diversity/international\\_mobility/index.html](http://www.dfg.de/en/research_funding/principles_dfg_funding/diversity/international_mobility/index.html)
- The Humboldt-Foundations offers grants such as [Feodor Lynen-Forschungsstipendien](#), [JSPS-Forschungsstipendien für Postdoktoranden](#), [MOST \(Taiwan\)-Forschungsstipendien](#).
- etc.

## KIT Karlsruhe Institute of Technology

### **Organizational obligations KIT:** no

To provide support for outgoing scientists as well as service for hosts here are detailed information on following websites:

- [https://ra.intl.kit.edu/img/Fyler\\_ReserachersMobility\\_.pdf](https://ra.intl.kit.edu/img/Fyler_ReserachersMobility_.pdf)
- <http://www.intl.kit.edu/english/index.php>
- <http://www.intl.kit.edu/ischolar/6556.php>

## DESY Deutsches Elektronen-Synchrotron – a Research Centre of the Helmholtz Association

### **Organizational obligations DESY:** no

At DESY, there is a DUAL CAREER SERVICE, where (only!) leading scientists and their partners get support when moving to DESY.

DESY offers its leading scientists a Dual Career service. The accompanying partner can make use of this Service during appointment or after moving to DESY. DESY cares for its employees and would like to make sure that the partner's career does not suffer because of the move. The Dual Career Team supports the partner in looking for suitable career opportunities in the Hamburg metropolitan area. The Dual Career Office of DESY is part of a Dual Career Network in the Hamburg area, which provides further opportunities for entering the job market.

Further information [http://www.desy.de/about\\_desy/career/employer\\_desy/dual\\_career/index\\_eng.html](http://www.desy.de/about_desy/career/employer_desy/dual_career/index_eng.html)

DESY has a **welcome service** including an International Office. The DESY Welcome Service is the central contact point for all German and foreign visitors, be it a guest scientist, a participant for a conference or a summer student. Assistance comprises information on foreign law, reservation of guestrooms, house hunting, language courses and cultural events. Their aim is to simplify the lives of DESY scientists and their families and to enable them to do first steps in Germany independently.

Further information: [https://welcome-services.desy.de/index\\_eng.html](https://welcome-services.desy.de/index_eng.html)

[https://welcome-services.desy.de/international\\_office/index\\_eng.html](https://welcome-services.desy.de/international_office/index_eng.html)

## MPG Max-Planck-Society

### Organizational obligations MPG: no

The Max Planck Society has developed various service activities to support mobility:

- The Max Planck Society has a Dual Career Service that works closely with companies in regional networks, and offers services to support life partners of scientists in their search for an appropriate job at a new location.
- Max Planck Society has special Welcome Services: many institutes offer local guest care services. For example <http://www.mpi-dortmund.mpg.de/students-postdocs/welcome-service>
- At 66 Max Planck Institutes, there are International Offices. The International Office (IO) provides information and support for new and prospective foreign scientists coming to the Max Planck Institute. Important issues are for example: Visa and guidance for application, Preparation before departure, How to find a flat & housing questions, First steps after arrival, Financial questions, Medical and liability insurance, Healthcare, Schools and day care in the vicinity, Driving license, Vehicle registration, Visa extension procedure and contacts with German Foreign Office, German and English language courses at various levels etc. For example <https://www.biochem.mpg.de/en/facilities/io>

In addition to these service activities, there are also internationalization measures and strategies to promote the internationalization of science and mobility.

- **Partner groups** are an instrument for the joint promotion of young scientists with countries interested in strengthening their research through international cooperation. These include India, China, Central and Eastern Europe and South American countries.
- **Max Planck Centers:** Scientific cooperation between the Max Planck Institutes and outstanding foreign partners in future-oriented research areas.
- **Max Planck Institutes in other countries:** Italy, Netherlands, Luxembourg, USA.

## Italy

### Legal obligations in Italy: no

## INFN National Institute for Nuclear Physics

### Organizational obligations INFN: no

### International mobility programs

LNGS might provide support to non-Italian students and researchers through specific mobility programs.

- The INFN Funding Program 'Spese Soggiorno Ospiti Ricercatori'
- Summer Student at LNGS according to US Dept. of Energy and INFN Summer Exchange Program ('DoE/INFN Summer Exchange Program');



- MAE (Ministry of Foreign Affairs), pursuant to Law 401/90

Further information <https://www.lngs.infn.it/en/international-mobility-programs>

INFN has one year (Fellowship Programme offering positions for research activity in Experimental and Theoretical Physics.

Further information for experimental physics: [http://www.ac.infn.it/personale/exp\\_fellowships/](http://www.ac.infn.it/personale/exp_fellowships/) and for theoretical physics: [http://www.ac.infn.it/personale/theo\\_fellowships/](http://www.ac.infn.it/personale/theo_fellowships/)

**Family support:**

- kind of family support for childcare
- money support for employees with children in kindergarten or school before 5 years old
- children facility inside Gran Sasso Laboratory opened during the summer season. During 2018, also Legnaro Laboratory will have an internal children facility for the summer season.

**CNR National Research Council**

**Organizational obligations CNR: no**

The **Short Term Mobility (STM) Program** enables Italian scholars to carry out research activities in cooperation with foreign Universities and Research Institutions of clear international standing.

It also enables highly qualified foreign scientists, belonging to foreign Universities and Research Institutions of clear international standing, to be invited to carry out research in cooperation with CNR Institutes so that Italian research can benefit from international activity and research taking place in our country.

CNR does therefore finance short - term stays of 21 days of Italian researchers and 10 days of foreign researchers engaged in international research projects of mutual interest.

The Programme has been implemented with success since 1995, in the framework of the initiatives for the development of international scientific cooperation. In particular, it has allowed the setting up and continuation of many cooperation activities which have brought about high - quality and important joint research results and the creation and implementation of highly specialized techniques in many different fields.

Further information <https://www.cnr.it/en/short-term-mobility>

## France

**Legal obligations in France:** no

**CNRS The National Center for Scientific Research**

**Organizational obligations CNRS:** no

The CNRS Gender Equality Plan includes the following measures:

**Mobility:**

- Address dual career couples issues
- Question the requirement for geographical mobility

**Accompany parenthood:**

- by informing staff members on the existing measures to support parenthood at CNRS
- by favouring paternal leave and the implication of fathers in the family.

**Child- and dependent-care support:**

- Develop child care and dependent-care options
- Cover work-travel related costs

**Favour aids to child- and dependent-care:**

- by organising a system of reimbursements of expenses for child and dependent care in case of professional travel, under certain conditions
- by improving the offers for places in nurseries

**Housing support:**

- Housing support e.g. for single parents

Further information <http://www.cnrs.fr/mpdf/IMG/pdf/planegalite.pdf>

## CEA The French Alternative Energies and Atomic Energy Commission

**Organizational obligations CEA:** no, but internal agreement called “convention de travail du CEA”

Measures to support permanent scientists (lasting 1 or 2 years max) making mobility:

Expenses covered at the beginning of mobility:

- Moving expenses and baggage’s transport costs (or furniture storage).
- The travel cost (go and back) in economic class is covered for the employee, his/her spouse and the children.
- The health cover (French insurances) is maintained during all the mission. A complementary insurance (civil responsibility and health risk) can be refunded on a case-by-case basis depending on the host country and the hosting organization.

Expenses covered during the mobility:

- A living allowance is provided, which amount is based on the French State officials reimbursement rate and varies according to the host country. This amount is reduced :
  - From the 31st day of mission, the living allowance will decrease of 20%,
  - If the employee is housed or fed by the hosting organization, the living allowance will decrease of 40%,
  - If the employee is housed and fed free of charges by the hosting organization, the living allowance will decrease of 80%.
- School fees can be covered up to the amount of distance learning school registration.
- Once a year for vacation, a round trip towards the main residence in France is covered for the scientist, his/her spouse and the children.

**Financial support:**

- living allowance which amount varies according to the country of destination and to the costs being supported by the host laboratory
- refund of moving costs
- health care: costs of an additional insurance

**Family support:**

- costs of tuition fees for children (distance learning)
- travelling expenses for the scientist and his family (once a year, roundtrip to France)

## Poland

**Legal obligations:** Yes

REGULATION OF THE MINISTER OF LEARNING AND HIGHER EDUCATION of October 12, 2006 on the conditions of directing persons abroad for scientific, didactic and training purposes as well as special rights of those persons.

REGULATION OF THE MINISTER OF LABOR AND SOCIAL POLICY of 29 January 2013 on claims owed to an employee employed in a state or local government unit of the budget sphere on a business trip.

**JU Jagiellonian University**

**Organizational obligations JU:** Yes

- Regulation No. 10 of the Rector of the Jagiellonian University of March 15, 2007 regarding: Rules and procedure for directing employees, PhD students and students abroad for scientific, didactic or training purposes

- Regulation No. 13 of the Rector of the Jagiellonian University of March 26, 2009
- regarding: changes in regulation No. 10 of the Rector of the Jagiellonian University in 2007 regarding the Principles and Procedure for Directing Employees, PhD Students and Students Abroad for Scientific, Teaching or Training purposes

#### The JU International Students Mobility Office

The ISO's main responsibilities include:

- Service delivery for international students and PhD students coming to the JU
- Service delivery for students and PhD students who pursue their studies at the JU as holders of scholarships awarded by the Polish party
- Managing accommodation for international students in the dormitories.
- Administering loans and benefits dedicated to international students under the U.S. Department of Education's Direct Loan Program, the U.S. Department of Veterans Affairs - Educational Benefit Programs and Canada-Ontario Integrated Students Loans.
- Giving opinions on agreements on joint doctoral assessment processes and providing information thereon.

Further information [http://www.dmws.uj.edu.pl/en\\_GB/start](http://www.dmws.uj.edu.pl/en_GB/start)

#### The JU International Visitors' Office

The IVO's main responsibilities include:

- Advice on formalities, including visa/residence permit, registration, health insurance, work-related issues, accompanying/supporting individuals in their direct dealings with the authorities
- Information on finding accommodation
- Counselling and family matters
- Support for JU departments and faculties hosting international guests
- Information on living in Krakow and Poland
- Events for international guests and their families

Further information [http://www.international.iro.uj.edu.pl/en\\_GB/about/about-welcome-centre](http://www.international.iro.uj.edu.pl/en_GB/about/about-welcome-centre)

Additionally, the JU supports mobility by offering rooms at its guesthouse to incoming scientists at affordable prices.

#### The International Cooperation Section of the International Relations Office

Among others the section is responsible for coordinating and registering **ERASMUS+** agreements (KA1 Mobility for learners and staff) and administrative-financial assistance to staff mobility, in particular:

- collaboration with the Erasmus+ coordinators,

- recruitment for JU staff mobility,
- providing information and assistance to participating staff,
- reports on staff mobility,
- organizing/co-organizing Erasmus Staff Training Weeks at the UJ

Further information [http://www.dwm.uj.edu.pl/en\\_GB/o-dziale/zadania](http://www.dwm.uj.edu.pl/en_GB/o-dziale/zadania)

#### HOMING (programme of the Foundation for Polish Science; one of the Polish RFOs)

The programme aims at financing for projects designed as postdoctoral fellowships, carried out by young doctors (postdocs) coming to Poland from abroad.

Eligible applicants:

- young doctors (regardless of nationality) who have had a doctoral degree for not longer than 5 years, where the start of this period is defined by the year of obtaining the degree and the end – by the year preceding the deadline for submitting applications in the competition. The 5-year period may be extended to a maximum of 9 years from obtaining the degree on the terms set down in the competition documentation.
- having stayed outside Poland uninterruptedly for at least 9 months for the purpose of conducting scientific research;
- intending to come to Poland no later than on the project's starting date, or having come to Poland no earlier than in the year preceding the deadline for submitting applications in the competition.

Projects lasting up to 24 months will be financed under the programme. For the duration of the project, the project manager (principal investigator; PI) shall be employed at the unit, with a commitment of at least 60% of a full-time employment for the purposes of project realisation. The Foundation does not determine in any way the maximum amount of the project budget that can be claimed with the competition application, however, for the purpose of estimation, the average budget of the HOMING project is approximately PLN 800,000 for the project lasting 24 months.

Further information <https://www.fnp.org.pl/en/oferta/homing/>

## Netherlands

**Legal obligations in the Netherlands:** no

**NWO The Netherlands Organisation for Scientific Research**

**Organizational obligations NWO:** no

**Rubicon** aims to encourage talented scientists at Dutch universities and research institutes run by KNAW and NWO to dedicate themselves to a career in postdoctoral research.

With a Rubicon grant scientists can conduct research for a period up to 24 months at a foreign research institute. The size of the grant depends on the destination chosen and the length of stay. NWO is able to fund around 60 young scientists through Rubicon every year (for a total sum of 7 million euros, spread over three rounds). For many scientists, experience abroad is an important step in their career.

Further information <https://www.nwo.nl/en/funding/our-funding-instruments/nwo/rubicon/index.html>

NWO uses various instruments to encourage the influx and promotion of female talent in Dutch science: Funding instruments specifically aimed at women: Aspasia, Athena, Westerdijk Talent Scheme and NWO Physics/f grants.

Programmes:

- Aspasia:  
<https://www.nwo.nl/en/funding/our-funding-instruments/nwo/aspasia/aspasia.html>
- Athena:  
<https://www.nwo.nl/en/funding/our-funding-instruments/cw/athena/athena-award.html>
- NWO Physics/f grants:  
<https://www.nwo-i.nl/en/nwo-domain-science/research-grants/other-grants/fomf-grants/>
- WISE:  
<https://www.nwo.nl/en/research-and-results/programmes/women+in+science+excel>

Within NWO, agreements have been made for the procedures of awarding funding in order for women – and men who want to combine work and care – not be put at a disadvantage due to inflexible requirements or unintentional stereotypes.

**Work-Life balance:**

NWO-I has several favourable employment conditions that must contribute to a positive work-life balance. For example, NWO-I has good facilities such as paid and unpaid parental leave and the possibility of part-time work is offered. A temporary employment agreement of a PhD researcher can be extended under certain conditions, for example due to pregnancy, parental leave or part-time working. Further NWO-I has a regulation for care and calamity leave. A specific regulation provides the possibility of childcare during business trips. Also the general conditions for teleworking, the possibility to purchase and sell holiday leave, and if needs be flexible work times are a stimulus for both women and men to combine their private and working lives as well as possible.

## Spain

**Legal obligations in Spain:** no

**IAC Instituto de Astrofísica de Canarias**

**Organizational obligations IAC:** yes

There is an agreement adopted by the Governing Council of the IAC in 2001 regarding mobility of scientists who may want to access a full time position:

*“Applicants who prepared their thesis at the IAC have to present accreditations of Complementary Training at other research centres, as stated under point 2 of the official announcement (this period should be either 1 continuous year or 18 accumulated months)”*

PhD students and scientists in Spain can apply for different public calls and programmes of mobility for financial support. The IAC offers specific facilities for postdoc positions in terms of relocation allowance for the selected candidate: the cost of the flight ticket (booked and issued by the IAC), temporary accommodation for up to two weeks (organised by the IAC) and per diem rate up to two weeks. The maximum IAC will reimburse is 2,000 Euros.

## Israel

**Legal obligations in Israel:** no

**Weizmann Institute of Science**

**Organizational obligations Weizmann Institute of Science:** no

Post-doctoral training abroad for 2-5 years is a necessary requirement of most research universities in Israel in order to receive a permanent staff position.

In order to increase the number of women who go abroad for post-doctoral training, the Institute offers a series of grants and programs for young female students and scientists, from all STEM fields.

### **Encouraging postdoctoral training overseas**

- **Post-doctoral research award for women in science (for post-doc training abroad)**

Weizmann Institute established and operates a national program for post-doctoral research awards to promote women in science. The program began in 2007 and 10 prizes are awarded each year, each up to 20,000 US\$ per year for two years, to female Israeli doctoral students from all universities in the country, for outstanding research in Life Sciences, Physics, Chemistry, Mathematics and Computer Science, who are going to pursue post-doctoral training abroad. This award adds to their salary from the host lab or to a dedicated post-doctoral fellowship. So far, 106 awards have been given and a significant percentage of recipients completed their training and were accepted as Faculty members in Israel.

A committee including senior faculty members (men and women) from different institutions in the country, representing the above fields, selects recipients according to scientific excellence. The President's Advisor for Advancing Women in Science is the program director and chair of the committee. The Advisor keep in touch with the winners, following their success in order to encourage active recruitment of outstanding young female scientists on campus.

– **Post-doctoral research award for women in science (for combined post-doc training in Israel and abroad)**

The Weizmann Institute launched a new program that allows women to combine post-doctoral training at the Weizmann Institute together with another laboratory abroad. The purpose of this scholarship is to enable outstanding doctoral candidate, who are unable to go abroad for an extended period of up to 5 years, to do research in a laboratory abroad for short periods and thus acquire the exposure and experience of working abroad that are so crucial to the development of a mature scientist. The hope is that this experience will help them to apply in the future for an academic post in Israel. The scholarship amounts 10,000 US\$ per year for two years. This is of course, in addition to the stipend given to any post-doctoral fellow at the Weizmann Institute. One fellowship was given in 2015 and one in 2016. The project is managed by Feinberg Graduate School together with the President Advisor for Advancing Women in Science.

– **Meetings of graduate students with returning scientists**

To encourage outstanding graduates to go abroad and reduce the challenges of traveling to the "unknown" with a family, meetings are held with young female scientists who have recently returned from their post-doctorate abroad and joined the Weizmann Faculty. Some of the meetings include the spouse of the scientists and of the students.

– **Information on post-doc opportunities and financial support for traveling**

We came to realize that the lack of information regarding post-doctoral training is a deterrent and inhibiting factor and therefore on the institution website we have included information regarding scholarships available to doctoral and post-doctoral fellows and frequently-asked Q&A about this type of travel abroad with a family.

Moreover, partial financial support is given for students traveling to choose a post-doctoral training position abroad.

– **Young mother scientists support for traveling**

The Institute encourages travel of young scientists and doctoral students to conferences and collaboration abroad. Support is given for young children accompanying mothers or purchasing an airline ticket more expensive because of the limited stay abroad, thus allowing young mothers to travel and take part in the international scientific world.



## Romania

**Legal obligations in Romania:** no

IFIN-HH Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering

**Organizational obligations IFIN-HH:** no

According to mobility support, IFIN-HH has no specific measures/best practice for mobility and this is for the simple reason that in IFIN-HH exists a certain balance (in terms of number of female scientists) and a highly professional quality at both individual and work-team level. Therefore, good mobility is a direct consequence, IFIN-HH being fully compliant with the political, scientific and managerial requirements prevailing in the EU space on this aspect.

IFIN-HH web-site for cooperation and partnerships: <http://www.nipne.ro/international/cooperations/>

## 8. List of references

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- Appelt, S. et al. (2015): "Which factors influence the international mobility of research scientists?" OECD Science, Technology and Industry Working Papers, 2015/02, OECD Publishing, Paris.
- Conchi, S. and Michels, C. (2014). Scientific mobility. An analysis of Germany, Austria, France and Great Britain. Fraunhofer ISI Discussion Papers Innovation Systems and Policy Analysis No 41.  
Online available: [http://www.isi.fraunhofer.de/isi-wAssets/docs/p/de/diskpap\\_innosysteme\\_policyanalyse/discussionpaper\\_41\\_2014.pdf](http://www.isi.fraunhofer.de/isi-wAssets/docs/p/de/diskpap_innosysteme_policyanalyse/discussionpaper_41_2014.pdf) (19.12.2017)
- DAAD/DZHW (Hg.) (2016): Wissenschaft Weltoffen 2016. Daten und Fakten zur Internationalität von Studium und Forschung in Deutschland. Bielefeld.
- Friesenhahn, I. and Beaudry, C. (2014): The Global State of Young Scientists, Berlin, Hannover.  
Online available: [https://globalyoungacademy.net/wp-content/uploads/2015/06/GYA\\_GloSYS-report\\_webversion.pdf](https://globalyoungacademy.net/wp-content/uploads/2015/06/GYA_GloSYS-report_webversion.pdf) (04.01.2018)
- Minssen, H. (2009): Karriere durch Auslandsentsendungen? ÖSZ 34(4), 41-59.
- Netz, N. and Schirmer, H. (2016): Internationale Mobilität von wissenschaftlichem Nachwuchs. Hannover: Deutsches Zentrum für Hochschul- und Wissenschaftsforschung (DZHW).
- Sekuła, P., Struzik, J., Krzaklewska, E., Ciaputa, E. (2018): Summary report including guidelines and outcome of the interviews.
- Thorn, Kristian; Holm-Nielsen, Lauritz B. (2006): International mobility of researchers and scientists: Policy options for turning a drain into a gain, Research Paper, UNUWIDER, United Nations University (UNU), No. 2006/83.
- <https://www.alumniportal-deutschland.org/en/science-research/news-from-science/infographics-scientists-on-the-move/> (04.01.2018)
- <https://hr.fbk.eu/en/services/internal-mobility> (04.01.2018)
- <https://www.mbaskool.com/business-concepts/human-resources-hr-terms/1785-career-mobility.html> (04.01.2018)
- <http://www.onpulsion.de/lexikon/persoennliche-entwicklung/> (04.01.2018)
- <https://dictionary.cambridge.org/de/worterbuch/englisch/career-development> (04.01.2018)
- <http://www.careers-advice-online.com/what-is-career-development.html> (04.01.2018)
- <http://www.sciencemag.org/careers/2011/08/international-mobility> (04.01.2018)