

## 2017 Helmholtz – OCPC – Programme for the involvement of postdocs in bilateral collaboration projects

### PART A

**Title of the project:** Stable perovskite solar cells

**Helmholtz Centre and institute:** Helmholtz-Zentrum Berlin Für Materialien und Energie

**Project leader:** Antonio Abate

**Web-address:** [http://www.helmholtz-berlin.de/pubbin/news\\_seite?nid=14587;sprache=en;typoid=3228](http://www.helmholtz-berlin.de/pubbin/news_seite?nid=14587;sprache=en;typoid=3228)

#### **Description of the project** (max. 1 page):

The growing energy demand and the necessity to retain a sustainable environment ask for more energy from renewable sources, such as sunlight, wind, rain, and geothermal heat. Photovoltaic solar cells (PVs), capable of converting sunlight directly into electricity, are one of the most promising sustainable energy solution. Since decades, silicon-based solar cells dominate the PV market. When the first silicon PV was demonstrated in 1954, the envisaged manufacturing costs made this technology impractical for large-scale power generation. Thereafter, exploiting new fabrication procedures and increasing the mass production systematically reduced the cost of silicon. Today, the cost of silicon represents only a fraction of the whole investment needed for a PV installation and further reductions will not significantly influence the cost of solar energy. Furthermore, silicon solar cells already reached a high level of optimization with certified light to electric power conversion efficiency close to the theoretical efficiency limit for silicon. A further substantial efficiency improvement cannot be expected for the already mature silicon-based solar cell technology. Therefore, in order to make the solar electricity the most convenient energy source, a new generation of more efficient and cost-effective solar cells is needed.

Perovskites have potential to play an important role in the next generation of solar cells, however their stability is almost unexplored and there remains a huge challenge to make long-term stable perovskite PVs. The goal of this project is to address the above challenge, demonstrating stable perovskite PVs with a lifetime equivalent to more than 25 years' European outdoor usage. The key strategy to achieve this goal is understanding and controlling the optoelectronic mechanisms at the interfaces between materials composing perovskite PVs. This strategy is innovative and unique because it will combine fundamental investigations, material processing and solar cell fabrication in a holistic approach. This approach is certainly ambitious yet credible considering the knowledge of the project leader in perovskites, the complementary expertise in solar cells and the facilities available at Helmholtz-Zentrum Berlin, where this project will take place.

**Description of existing or sought Chinese collaboration partner institute** (max. half page):

The project leader (PL) is a Visiting Professor at Fuzhou University where he has an active collaboration with Prof. Mingdeng Wei. The PL has been visiting the group of Prof. Wei in Fuzhou last year to discuss projects and grant applications. In collaboration with Prof. Wei the PL recently submitted a proposal for National Natural Science Foundation of China International Cooperation and Exchange Program.

**Required qualification of the post-doc:**

- PhD in chemistry, physics or materials science
- Experience with optoelectronic device or solar cells fabrication and testing
- Additional skills in data analysis

**PART B**

**Documents to be provided by the post-doc:**

- Detailed description of the interest in joining the project (motivation letter)
- Curriculum vitae, copies of degrees
- List of publications
- 2 letters of recommendation

**PART C**

**Additional requirements to be fulfilled by the post-doc:**

- Max. age of 35 years
- PhD degree not older than 5 years
- Very good command of the English language
- Strong ability to work independently and in a team