Training Opportunity for Swiss Trainees

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<th>Reference</th>
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<th>Duty Station</th>
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<td>CH-2017-TEC-SF(3)</td>
<td>Advanced Concepts in Condensed Matter Physics</td>
<td>ESTEC</td>
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**Overview of the unit’s mission:**
The Advanced Concepts and Studies Office is ensures the overall coordination, coherence and performance of program and corporate studies in support of the Agency’s future activities, in line with its long-term strategic objectives and priorities, manages the General Studies Programme (GSP, [www.esa.int/gsp]), in support of all the Agency’s programmes and in particular of the Director General and the Strategy Department (DG-S), supports the selection of activities; and manages the Advanced Concepts Team (ACT, [www.esa.int/act]), in charge of beyond the horizon multidisciplinary research for space, exploring new approaches to space related R&D (including competition, prizes, games), research for disruptive innovation, developing an expert network at academic level, and providing a capability for fast first look analysis of problems, challenges and opportunities. Within the European Space Agency, the ACT is engaging in collaborative research relations with university institutes and research centres, focusing on advanced research topics of potential strategic interest to the space sector and in experimenting with new forms of teamwork. In order to achieve this goal a multidisciplinary research environment is provided, in which young scientific and engineering post-doctoral and post-graduate researchers carry out work on emerging technologies and innovative concepts. Candidates are strongly encouraged to visit the website of the team to obtain more information about the team in preparation of their application and interview.

**Overview of the field of activity proposed:**
Condensed Matter Theory (CMT) deals with the properties of matter in condensed phases such as in liquids, plasmas and solids. It draws upon quantum, electromagnetic, thermal and statistical physics extensively and overlaps with material science, nanotechnology, and chemistry; in a sense it is mesoscopic physics, as opposed to micro- or macroscopic, and therefore benefits both from theoretical progress on the small scale and applications on the large scale. Due to this breadth and applicability CMT has grown into the most active branch of contemporary physics.

The successful candidate will perform research in the field of Condensed Matter Theory and especially its applications to space systems. A specific aim of this project lies in exploring aspects of the connection between high energy and gravitational physics (AdS/CMT) that has proven promising as a framework for understanding the properties of condensed matter systems. Depending on the particular background and interests of the candidate, the focus can evolve to different projects in CMT. For example some research directions include:
- Applications of nanostructured materials to space systems
- Quantum emulation of gravitational physics (analogue gravity)

The successful candidate will be a member of the Advanced Concepts Team ([http://www.esa.int/act](http://www.esa.int/act)) and is therefore expected to contribute to the development and the assessment of new concepts and technologies for space applications in close interaction with ACT researchers who work on a broad range of disciplines including, informatics, artificial intelligence, climate modelling, energy systems, fundamental physics, biomimetics, computational management science and mission analysis. Based on her/his detailed background and interests and the opportunities and needs of the team, the successful candidate will be involved in a number of other ACT initiatives (including studies conducted via the Ariadna scheme, [http://www.esa.int/ariadna](http://www.esa.int/ariadna) and participate in reporting and communicating results of the team (internally and externally).

**Required education:**
Applicants should have just completed, or be in their final year of a University course at Masters Level (or equivalent) in a technical or scientific discipline, specifically in Physics or related fields. Applicants should have a good theoretical background and strong interest in condensed matter, quantum physics. Theoretical background in general relativity would be an asset.

Applicants should show a genuine interest in applied academic research, together with sound analytical skills, avid curiosity and a natural aptitude to self-motivation and teamwork. Applicants should have good interpersonal and communication skills and should be able to work in a multi-cultural environment, both independently and as part of a team.

Applicants must be fluent in English and/or French, the working languages of the Agency. A good proficiency in English is required.