



Stockholms  
universitet

**Ref. No.** SU FV-0349-20

**Closing date:** 1 March 2020.

## PhD student in Experimental Physics towards High-Pressure Calorimetry and Studies of Electronic Properties of Quasicrystals at Low Temperature

at [the Department of Physics](#), Stockholm University.

The Department of Physics is located in the AlbaNova University Center and has approximately 240 employees, 250 students at undergraduate level and 90 graduate students. There are four research subjects within the postgraduate program: Physics, Theoretical Physics, Chemical Physics and Medical Radiation Physics. These subjects span over several research groups with different research activities.

### **Project description**

Subject: Physics.

The quantum materials characterization group at Stockholm University invites applications for a fully funded PhD student position towards thermodynamic studies of quasicrystals under high pressure at low temperature. The applied position is tied to the project [Functional Quasicrystals? – Harnessing the complexity of aperiodic intermetallic compounds \(FuncQC\)](#) supported by the Knut & Alice Wallenberg Foundation. The PhD project is exploratory, focused on low-temperature material characterization of quasicrystals with functional electronic and magnetic properties.

There is an ever-growing demand for functional materials to build novel or optimized applications and devices, yielding worldwide fundamental and applied research efforts. Strongly correlated materials are systems in which electrons do not behave as independent free particles, but interact strongly, generating complex phenomena that cannot be explained by the conventional theories of metals and insulators. Such systems include, among many others, high- $T_c$  superconductors, heavy fermions and different kinds of magnetic systems. The aperiodic structure of quasicrystals adds a complication to the electronic behavior or correlated materials. A multi-faceted experimental characterization of such compounds is essential in order to draw solid conclusions about their behavior.

Within this research project, the PhD student will work on building up a high-pressure specific heat setup and apply it to study the electronic properties of small quasicrystals at low temperatures. The setup will integrate nanocalorimetry and high-pressure diamond anvil cell technology into a dilution refrigerator with a 12 T magnet and optical access. The high-

pressure characterization will be complemented with ambient-pressure measurements of low-temperature electronic specific heat as a function of temperature, magnetic field and magnetic field direction, measurements that can provide important bulk information on the studied systems.

The candidate should have a strong interest in condensed matter physics, experimental measurements and measurement techniques, optics, and low-temperature physics. The project activities will be carried out at AlbaNova, in close collaboration within the FuncQC project, including researchers at the chemistry department at Stockholm University, the Departments of Chemistry and Geosciences at Uppsala University, the Royal Institute of Technology (KTH), the European Spallation Source (ESS) in Lund, and abroad.

### **Education at the research level**

A PhD education at Stockholm University is four years (48 months). The 4-year PhD program includes at least 3 years of research and at most one year of course work. The position may be extended by up to one year if up to 20 % teaching assistance or administration is included in the contract. The PhD student is employed ("doktorandanställning") during the studies, with a monthly salary starting at SEK 26 500.

### **Qualification requirements**

An applicant who has completed a second-cycle (master's) degree, or completed courses equivalent to at least 240 higher education credits (4 years of studies), of which 60 credits must be in the second cycle, or have otherwise acquired equivalent knowledge in Sweden or elsewhere, meets the general entry requirements.

In order to be accepted as a PhD student in Physics or Theoretical Physics a BSc in Physics (or equivalent) is required. The studies must include 60 credits of second-cycle courses in physics out of which at least 15 credits correspond to a second-cycle degree project. The degree project does not have to have been examined at the application deadline, but work corresponding to half a semester of full-time studies should have been devoted to it. For the subject Chemical Physics courses in chemistry may replace the required physics courses. The qualification requirements must be met by the deadline for applications.

### **Selection**

The selection among the eligible candidates will be based on their capacity to benefit from the training. The successful applicant will be selected based on documented theoretical and experimental knowledge relevant for the area of study, knowledge of scientific theory and method, analytical skills, personal motivation and team working skills. Well-developed English language skills are required. The applicants are encouraged to provide supporting documents that substantiate qualifications, e.g., knowledge, skills, abilities and experience. References and interviews will be used to assess qualifications of the applicants. We seek a self-motivated candidate with good analytical abilities and skilled in English.

Admission Regulations for Doctoral Studies at Stockholm University are available at: [www.su.se/rules and regulations](http://www.su.se/rules_and_regulations).

### **Terms of employment**

Only a person who will be or has already been admitted to a third-cycle programme may be appointed to a doctoral studentship.

The term of the initial contract may not exceed one year. The employment may be extended for a maximum of two years at a time. However, the total period of employment may not exceed the equivalent of four years of full-time study.

Doctoral students should primarily devote themselves to their own education, but may engage in teaching, research, and administration corresponding to a maximum of 20 % of a full-time position.

Please note that admission decisions cannot be appealed.

Stockholm University strives to be a workplace free from discrimination and with equal opportunities for all.

### Contact

For more information, please contact Associate Prof. Andreas Rydh, [andreas.rydh@fysik.su.se](mailto:andreas.rydh@fysik.su.se).

Further information about the position can be obtained from Prof. Per-Erik Tegnér, [tegnér@fysik.su.se](mailto:tegnér@fysik.su.se).

### Union representatives

Ingrid Lander (Saco-S), telephone: +46 708 16 26 64, [saco@saco.su.se](mailto:saco@saco.su.se), Alejandra Pizarro Carrasco (Fackförbundet ST/Läraryrket), telephone: +46 8 16 34 89, [alejandra@st.su.se](mailto:alejandra@st.su.se), [seko@seko.su.se](mailto:seko@seko.su.se) (SEKO), and PhD student representative, [doktorandombud@sus.su.se](mailto:doktorandombud@sus.su.se).

### Application

Apply for the PhD student position at Stockholm University's recruitment system. It is the responsibility of the applicant to ensure that the application is complete in accordance with the instructions in the advertisement, and that it is submitted before the deadline.

Please include the following information with your application

- Your contact details and personal data
- Your highest degree
- Your language skills
- Contact details for 2–3 references
- **Important:** *Your academic referees should send us recommendation letters no later than March 1, 2020, via e-mail to: [FV-0349-20.refletters@fysik.su.se](mailto:FV-0349-20.refletters@fysik.su.se) and state in the subject line: SU FV-0349-20 + name of the applicant.*

and, in addition, please include the following documents

- Cover letter describing among other things:
  - – why you are interested in the field/project described in the advertisement
  - – what makes you suitable for the project in question
- CV – degrees and other completed courses, work experience and a list of degree projects/theses
- Degree certificates and grades confirming that you meet the general and specific entry requirements (no more than 6 files)
- Degree projects/theses (no more than 6 files).

The instructions for applicants are available at: [Instructions – Applicants](#).

### You are welcome to apply!

*Stockholm University contributes to the development of sustainable democratic society through knowledge, enlightenment and the pursuit of truth.*

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