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## **PhD position in experimental particle physics at Uppsala University and the University of Göttingen (double PhD degree - Co-tutelle)**

There is an opening for a PhD student (f/m/d) as part of a double PhD Co-tutelle program at Uppsala University (in the group of Prof. Arnaud Ferrari) and at the University of Göttingen (in the group of Prof. Stan Lai) with a planned start date of 1 October 2022. Qualified and highly motivated candidates who are willing to carry out research and studies towards a PhD degree in the field of particle physics are welcome to apply. The successful candidate will join two research groups participating in the ATLAS experiment at the CERN Large Hadron Collider (LHC), at both Uppsala University and the University of Göttingen (Germany) in the framework of a double PhD degree. In particular, it is envisioned that the candidate will spend the first two years in Göttingen, before being based in Uppsala for the second half of the PhD thesis, up to and including the defence.

The financial support will be commensurate with the compensation for Ph.D. students at the institute where the successful candidate is based. In Göttingen, this corresponds to pay grade **TV-L E13 50%** (regular working hours of 19,9 hrs/week). While in Uppsala, the rules governing PhD students are set out in the Higher Education Ordinance chapter 5, §§ 1-7 and in Uppsala University's rules and guidelines. The employment is a temporary position according to the Higher Education Ordinance chapter 5 § 7. The scope of employment is 100%.

### **Research topic**

CERN's LHC and the ATLAS experiment are at the forefront of fundamental research in high-energy physics. The important goal of discovering the Higgs boson was achieved in 2012, but the LHC and its detectors were also designed to explore physics beyond the Standard Model. During Run 2 (2015-2018), the LHC collided protons at an energy of 13 TeV. Run 3 is now starting, with an increased collision energy of 13.6 TeV and more intense beams of protons. The Run 3 dataset to be collected 2022-2025 is expected to be twice larger than that recorded during Run 2.

For a complete validation of the Standard Model, one must establish and measure the so-called Higgs boson self-coupling, through the observation of the simultaneous production of two Higgs bosons in proton-proton collisions. In addition, such experimental signatures also appear in several theoretical scenarios beyond the Standard Model. Therefore, the main goal of the research project is to probe both one of the fundamental mechanisms of the Standard Model as well as theoretical models beyond it, by using final states that are consistent with two Higgs bosons.

The research groups of Arnaud Ferrari (Uppsala) and Stan Lai (Göttingen) are members of the international collaboration that operates the ATLAS experiment, which collects LHC proton-proton collision data at CERN. The successful candidate is thus expected to contribute to the research programme of the ATLAS Collaboration and, in particular, be involved in search for pairs of Higgs bosons with tau-lepton and b-quark final states. While in Uppsala, the successful candidate will also be engaged in theoretical interpretation work of Higgs boson pair search results in collaboration with Prof. Stefano Moretti of the Theoretical High Energy Physics (THEP) group.

### **Duties**

The successful candidate is expected to actively participate in the research activities of the hosting groups. Additionally, as a member of a large international collaboration like ATLAS, PhD students regularly present their work in collaboration meetings and are expected to perform some degree of service work for the collaboration within the duration of the position, in the form of duties that are not directly related to the research subject of the PhD thesis. It is envisaged that such service work

include studies of triggers as well as data-taking shifts. Research stays at CERN are possible during this four year period, and opportunities for pedagogical development can also be offered.

## Requirements

The successful candidate must have a strong interest in working in an international environment, in experimental particle physics, and also with phenomenologists. The successful candidate should have completed a Master degree (or equivalent) in physics, with emphasis in particle physics, or be in a position to obtain such a degree before admission to the PhD program.

Good software and data-analysis skills, e.g. in machine learning techniques or statistical analyses, are considered as an additional merit for this PhD position.

Finally, good communication skills in English are required.

## For further information about the position, please contact:

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Applications should include a curriculum vitae, a statement of research interests, and copies of the degrees attained. Arrangements for two letters of reference should also be made sent to Arnaud Ferrari and Stan Lai. Please submit your application by 31 May 2022, UFV-PA 2022/1820 through Uppsala University's recruitment system:

<https://uu.varbi.com/en/what:login/type:job/jobID:507136>

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The University of Göttingen is an equal opportunities employer and places particular emphasis on fostering career opportunities for women. Qualified women are therefore strongly encouraged to apply in fields in which they are underrepresented. The university has committed itself to being a family-friendly institution and supports their employees in balancing work and family life.

The mission of the University is to employ a greater number of severely disabled persons. Applications from severely disabled persons with equivalent qualifications will be given preference.

With submission of your application, you accept the processing of your applicant data in terms of data-protection law. Further information on the legal basis and data usage is provided in the Hinweisblatt zur Datenschutzgrundverordnung (DSGVO) <https://www.uni-goettingen.de/hinweisdsqvo>

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