



1 Advertisement

Post Title: Research Fellow in Experimental Particle Physics – ATLAS Upgrade and SWIFT-HEP Projects

School/department: Department of Physics and Astronomy, school of Mathematical and Physical Sciences

Hours: Full time or part time hours considered up to a maximum of 1.0 FTE

Requests for flexible working options will be considered (subject to business need).

Contract: Fixed term until June 1st 2025, with possibility of extension based on funds availability

Reference: 20833/20834

Salary: Research Fellow I starting at £37,099 to £44,263 per annum, pro rata if part-time.

Placed on: 29 August 2023.

Closing date: 05 October 2023. Applications must be received by midnight of the closing date.

Expected Interview date: To be confirmed

Expected start date: As soon as possible

The Experimental Particle Physics group at Sussex seeks to appoint up to **two** talented and creative researchers, with strong computational and experimental skills, to join Sussex's vibrant research programme on Experimental Particle Physics. The application of more senior researchers is strongly encouraged. The posts focus on the implementation of efficient tracking strategies to the ATLAS experiment Phase 2 upgrade of the High Level Trigger, contributing in parallel to analogous R&D within the SWIFT-HEP inter-experiment project. The successful candidates will be expected to work on the development, deployment and benchmarking of High Level Synthesis FPGA algorithms for real-time Particle Physics applications, where the group has significant institutional commitments.

The posts are funded until June 1st 2025. Extension beyond this date will depend on future funding opportunities. The Sussex ATLAS group has significant involvement in both the ATLAS Upgrade and the SWIFT-HEP efforts, and continuation will be considered depending on funding. Candidates are expected to hold, or be close to obtaining, a doctorate in experimental particle physics and to have a demonstrated track record of internationally recognised research at a large-scale collider experiment.

Please contact Professor Alessandro Cerri (a.cerri@sussex.ac.uk), Professor Fabrizio Salvatore (p.f.salvatore@sussex.ac.uk) and Professor Antonella De Santo (a.de-santo@sussex.ac.uk) for informal enquiries.

The University is committed to equality and valuing diversity, and applications are particularly welcomed from women and black and minority ethnic candidates, who are under-

represented in academic posts in Science, Technology, Engineering, Medicine and Mathematics (STEMM) at Sussex.

For full details and how to apply see our [vacancies page](#)

The University of Sussex values the diversity of its staff and students and we welcome applicants from all backgrounds.

2. The School / Division

Please find further information regarding the school/division at the [Physics and Astronomy website](#) and on the [EPP group website](#)

3. Job Description

Job Description for the post of: Research Fellow in Experimental Particle Physics – ATLAS Upgrade and SWIFT-HEP Projects

Department: Physics

Section/Unit/School: MPS

Location: Falmer campus - Brighton

Grade: Research Fellow I, 7 (spinal point to be defined depending on seniority)

Responsible to: PI through to Head of School

Responsible for: N/A

Research Fellow I is an early career-grade research position. Post-holders will be expected to contribute to the work of the research team, and also to develop their research skills with support from more experienced members of staff.

PRINCIPAL ACCOUNTABILITIES

1. To engage in individual and collaborative research activity resulting in high-quality publications; and to develop research funding and knowledge exchange income individually or in collaboration with others, as appropriate, depending on the size and scope of the bid.
2. To contribute to School teaching activities.

4. Person Specification

KEY RESPONSIBILITIES

1. Research, Scholarship & Enterprise

- 1.1 Develop research objectives and proposals for own or joint research, at acceptable levels, with assistance if required.
- 1.2 Conduct research projects individually and in collaboration with others.
- 1.3 Analyse and interpret research findings and draw conclusions on the outcomes.
- 1.4 Produce high-quality research outputs for publication in monographs or recognised high-quality journals, or performance/exhibition, as appropriate, and contribute to the School's REF submission at acceptable levels of volume and academic excellence.
- 1.5 Contribute to the preparation of proposals and applications to external bodies, for example for funding purposes.
- 1.6 Individually or with colleagues, explore opportunities for enterprise activity, knowledge exchange income and/or consultancy, where permissible.
- 1.7 Build internal contacts and participate in internal networks and relevant external networks in order to form relationships and collaborations.
- 1.8 Continually update knowledge and understanding in field or specialism, and engage in continuous professional development.

2. Teaching & Student Support

- 2.1 Undertake teaching duties, if required.
- 2.2 Assist in the assessment of student knowledge and supervision of student projects if required.
- 2.3 Assist in the development of student research skills, for example as part of a postgraduate supervision team.

3. Contribution to School & University

- 3.1 Attend and contribute to relevant School and project meetings.
- 3.2 Undertake additional duties, as required by the Principal Investigator and/or Head of School.

4. Role-specific duties

- 4.1. To contribute to Sussex's commitments with the ATLAS HLT Upgrade and SWIFT-HEP programs, in particular on the development and benchmarking of a hybrid HLS+CPU prototype for real-time and offline reconstruction.

- 4.2. To contribute to the R&D activities for HL-LHC (in particular in the framework of the ATLAS experiment upgrade of the Event Filter tracking system) and future colliders, commensurately to funding.

ESSENTIAL CRITERIA

1. Normally educated to doctoral level, or other equivalent qualification, or appropriate level of experience, as appropriate to the discipline (see role-specific criteria below).
2. Evidence of engagement in high-quality research activity.
3. Excellent presentation skills, with the ability to communicate effectively, both orally and in writing, with students, colleagues and external audiences.
4. Ability to work individually on own initiative and without close supervision, and as part of a team.
5. Ability to exercise a degree of innovation and creative problem-solving.
6. Excellent organisational and administrative skills.
7. Ability to prioritise and meet deadlines.
8. Excellent IT skills.

ESSENTIAL ROLE-SPECIFIC CRITERIA

1. Substantial knowledge of software or firmware development or ASIC design with VHDL and/or HLS.
2. Good knowledge and experience of programming (C++ or Python or VHDL/HLS).
3. Experience with the documentation of coding and portability practices.
4. A creative approach to problem-solving with a high-level analytic ability.

In addition, desirable role-specific criteria:

1. Experience of FPGA firmware development with VHDL and/or HLS.
2. Experience of heterogeneous computing development (GPU, FPGA, Arm).
3. Experience of Machine Learning approaches to particle reconstruction/data analysis.
4. Experience with state-of-the-art FPGAs.
5. Experience in real-time object reconstruction, data analysis techniques and algorithms in Particle Physics.
6. Experience with electronic hardware and/or detector operations in High Energy Physics.
7. Experience working in an international collaborative environment.

DESIRABLE CRITERIA

1. Emerging track record of high-quality publications in reputable journals and other appropriate media of similar standing.
2. Experience of generating research or knowledge exchange income.