

# Snowmass 2021—Letter of Interest

## *The Joint Universities Accelerator School (JUAS)*

<http://juas.eu>

### **Thematic Areas**

- (AF1) Beam Physics and Accelerator Education
- (CommF2) Career Pipeline Development
- (CommF4) Physics Education

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### **Context**

An appreciation of the breadth and depth of the utility of particle accelerators to our modern technological society can be taken for granted among those charged with policy-making and public or commercial investment. Medical therapies, the application of photon and particle probes in industry, material science, chemistry, biology, pharmaceutical development and applied nuclear science will continue to stimulate demand for the expertise of well-trained specialists in accelerator science and technology.

While the development of particle accelerators has long been driven by the needs of high-energy nuclear and particle physics, the construction and operational cycles of the highest energy machines are growing ever longer and the machines larger but fewer in number. One can no longer rely on short-term demand. Rather, global collaboration, long-term planning and mobility will be increasingly vital to ensure that the right people, with the right experience and skills will be available at the right place and time to design, construct and operate them.

Thus, a plausible example of a career path of a future collider specialist now entering the field could involve phases spent working in Europe on the HL-LHC, later on the Electron-Ion Collider in the USA, and later still on the larger colliders like the FCC, ILC or CEPC, envisaged in Europe or in Asia.

Since few universities have the facilities needed for a full education in accelerator science and technology, specialised regional educational institutions have been created to provide it. For decades now, they have led the way—like the accelerator laboratories themselves—in fostering an ethos of international collaboration and cultural diversity.

## **JUAS’ role in Beam Physics and Accelerator Education**

The Joint Universities Accelerator School (JUAS), established at the European Scientific Institute (ESI) campus, in France close to CERN, has provided post-graduate education in the science and technology of particle accelerators to well over a thousand students since 1994. While at JUAS, most of them earn ECTS credits towards Masters or Doctoral degrees at our 16 Partner Universities in Europe and many are already engaged in research at CERN and other laboratories. Other participants include students at other universities around the world and early-career professionals seeking to enhance their applicable knowledge and skills. After JUAS, many have developed their careers in the large accelerator laboratories industry or universities, in Europe and worldwide.

The first 5-week residential course covers the science of particle accelerators while the second focuses on their technology and applications. Students can enrol in one or both courses. University-style lectures are delivered on-campus by experts from CERN, the Partner Universities and research laboratories. Learning is reinforced by collaborative sessions and design workshops. Lectures and laboratory work also take place during visits to CERN, other nearby accelerator laboratories (ESRF in Grenoble, PSI in Villigen) and industrial companies that develop accelerator technology. A series of seminars supplements the detailed studies to provide a wider view of the latest developments. Exams are held in the final weeks. The extended format is complementary to the other accelerator schools with which JUAS maintains close links.

Thanks to its support from these and several other laboratories, the 16 Partner Universities, several technology companies, and local government, JUAS at ESI is able to provide a thorough fundamental education in accelerator science and technology at moderate cost. Further details can be found at our Web site.

## **Statement of intent**

JUAS will continue its mission to train future generations of accelerator experts. To this end, it welcomes extension of its network of Partner Universities and collaborating accelerator laboratories and encourages further inter-regional exchanges and collaboration in accelerator education. Qualified and motivated students from all nations and backgrounds are especially welcomed.