



The 39th edition of the Joliot-Curie International School, entitled “*The interplay between atomic electrons and the nucleus*”, will cover the latest scientific achievements in physics across the blurred line separating the nucleus from the rest of the atom.

Although the energies of atomic and nuclear phenomena differ by several orders of magnitude, the interaction between the nucleus and the atomic electrons provides powerful tools for nuclear physics, giving access to properties of the nucleus such as the nuclear radius, the electromagnetic moments or the spin. Conversion-electron spectroscopy, combined with gamma-ray spectroscopy, is also a powerful tool for nuclear structure studies. Moreover, the distribution of electrons around the nucleus dictates the chemical properties of the elements. For super-heavy nuclei, chemistry can be a tool for the physicist to characterize new isotopes.

These subjects have made spectacular progress as shown by many recent results, for example at GSI, JINR Dubna and RIKEN for heavy and super-heavy nuclei. In parallel, new instruments are being developed to extend these studies to even more exotic nuclei for precision measurements, for example at ISOLDE/CERN, University of Jyväskylä and GANIL/SPIRAL2. The electronic environment can even change the properties of the nucleus. For example, within a plasma the apparent lifetime of a nucleus or the effective cross-section of nuclear reactions can be significantly modified. The study of these phenomena of astrophysical interest will be possible in the near future with the new generation of high-power lasers, such as APOLLON in France or ELI pillars in eastern Europe. The multi-Petawatt lasers also offer promising perspectives for particle acceleration (electron, gamma, ion and neutron).

These research subjects at the frontier between atomic and nuclear physics are by nature interdisciplinary. The school will be an opportunity for nuclear physics students to learn about the effects of atomic electrons on nuclear properties, and for atomic physics students to discover the impact of their field on the present knowledge of the nucleus. They will present their work within a poster session at the beginning of the week.

This edition of the school had been initially scheduled last year, but it was postponed due to the pandemic. It will now take place from October 3 to 8 at *La Vieille Perrotine*, a



CNRS resort located on the Oléron island along the French Atlantic coast, accessible from the TGV train station of La Rochelle and the airports of La Rochelle and Bordeaux:

<https://www.caes.cnrs.fr/sejours/la-vieille-perrotine/>

Participants are expected to arrive on the afternoon of Sunday 3 and leave on Friday 8 after lunch. **Pre-registration is open from May 1 to 31.** Details on the registration procedure, and the school in general, can be found at:

<https://ejc2021.sciencesconf.org/>

Acceptance will be communicated by e-mail before June 15, along with the procedure to follow for the final registration and payment. The school will cover the accommodation costs of participants from institutions that support EJC2021, and if the final budget allows we might also help some participants from other institutions. If you would like to benefit from such support, please ask for it in your pre-registration.

On behalf of the Organizing Committee: Serge Franchoo, Aurélie Gontier (secretary), Miguel Marqués (chair), Soizic Milhoud (communication), Gerda Neyens, Medhi Tarisien, Christophe Theisen, and Marine Vandebrouck.

PS/ List of speakers and lectures (more details to come on the website):

- Mathias Gerbaux (CENBG, France): *“Ion traps in nuclear physics”*.
- Anastasia Borschevsky (Univ. of Groningen, Netherlands): *“High-accuracy electronic structure calculations in support of spectroscopy experiments”*.
- Ruben de Groot & Iain Moore (Univ. of Jyväskylä, Finland): *“Optical spectroscopy techniques to measure nuclear moments and charge radii”*.
- Araceli Lopez Martens (IJCLab, France): *“Internal-conversion electron spectroscopy: experimental techniques and challenges”*.
- Adriana Pálffy (MPI-K, Germany): *“Electron-nucleus interaction and nuclear effects in atomic transitions”*.
- Sebastian Raeder (GSI, Germany): *“Physics and chemistry of the heaviest elements”*.
- Medhi Tarisien (CENBG, France): *“Nuclear physics with high-power lasers”*.