Call for papers - EPJ N Topical Issue on **Research Reactor use and projects on modeling and experimental breakthroughs for Advanced Nuclear Reactors**

Guest Editors: Patrick Blaise, In-Cheol Lim and Gilles Bignan

For more than 70 years, research reactors have played an important role in the development of nuclear science and technology. Research reactors are an essential basis for the development and evolution of nuclear energy. They paved the way for civilian nuclear energy use with the divergence of the first atomic pile CP-1 in 1942 in Chicago. They have made significant contributions to a large number of disciplines (such as neutronics, materials and fuels behaviour under irradiation, consequences of accidents), among the validation of new concepts and prototypes. They also ensure teaching and operator training on actual nuclear facilities in about 70 countries worldwide. In addition, research reactors are also implemented to meet research needs in Basic Physics (to investigate, for example, the fundamental structure of matter), as well as in various areas of industrial applications. Furthermore, they stand as an unrivalled tool to produce radionuclides for medical uses such as diagnosis and radiation therapy.

This diversity of uses is echoed by a very wide variety of facilities, together with activities often performed within an international framework, and relating not only to reactor design and operation, but also to programs developed in these reactors.

With the EPJ N editorial board, we invite you, as experts in the field of research reactors, to participate in this Topical Issue intended to focus on the modeling and experimental advances and recent breakthroughs in the field of advanced nuclear reactors, with a major interest in the interpretation of unpublished experimental results. Nuclear reactors considered in this Topical Issue include, but are not limited to, microreactors, special purpose reactors, reactors for space applications, and Gen-IV reactors, including molten salt and gas-cooled reactors.

The relevant topics include core design, multiphysics methods and analyses, experimental and computational material characterization, and the ML/AI method to accelerate the development and deployment of advanced nuclear reactors.

The proposed subsections relate to:

- Zero power reactors, with a focus on nuclear data validation and core physics
- Material testing reactors, with a focus on innovation and on irradiation devices and instrumentation
- Safety studies: state-of-the-art current programs and challenges on multiphysics
- Education and training

Papers on national and international frameworks of collaboration and networking around large-scale facilities will also be carefully reviewed.

We invite contributors to communicate their intention to submit manuscripts for this Topical Issue to the Guest Editors as soon as possible. We refer you to the EPJ N's Instructions for authors to provide you with some guidance on how to prepare your article. The manuscripts should be submitted before the deadline directly to the EPJ N Editorial Office.

Submission Deadline: October 30, 2023.

Guest Editors:

- Patrick Blaise PhD, Research Director, Scientific Division Energies, CEA Saclay
- In-Cheol Lim PhD, Vice President at the Korea Atomic Energy Research Institute (KAERI)
- Gilles Bignan PhD, JHR User Facility Interface Manager, Reactor Studies Department, CEA Cadarache