

## Topical Issue on Finite Range Effective Interactions and Associated Many-Body Methods - A Tribute to Daniel Gogny

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The first Gogny Conference was organized by the DAM Ile-de-France research center of the Commissariat à l’Energie Atomique et aux Energies Alternatives (CEA) to honor Daniel Gogny’s scientific career and to gather, for the first time during an international meeting, nuclear theoreticians who develop and exploit finite range effective nucleon-nucleon interactions, in particular the Gogny force. It was held in Bruyères-le-Châtel, France, on December 8–11, 2015. Daniel Gogny deeply changed our understanding of the atomic nucleus when he introduced, in the early 70s, a finite range nuclear effective interaction. The Gogny force still serves as a benchmark for the latest developments in nuclear theory. Daniel Gogny has spent most of his career at the CEA DAM. He has deeply contributed to its national and international scientific standing and has left his mark on a large community, especially in training several generations of physicists. His contribution to the scientific research performed at the CEA was not limited to nuclear physics. He also ingeniously tackled problems related to the radar electromagnetic signature, and to atomic and plasma physics. In September 1991, he received the Prix Joliot-Curie for designing the Gogny force, and in 1996 he was named “Chevalier dans l’Ordre des Palmes Académiques”. In 1999 he was awarded the “biennial Lazare Carnot” scientific prize, and in 2006 the CEA recognized the body of his work (spanning more than 40 years), and contributions to scientific advancement in France. Even now, Daniel Gogny’s work plays a crucial role in improving nuclear data accuracy. Daniel retired from the CEA in 2004 but continued to mentor doctoral students and work with his collaborators, such as Walid Younes at Lawrence Livermore National Laboratory (LLNL), for the next 11 years. During his latter years at LLNL, Daniel made seminal contributions to our fundamental understanding of the nuclear fission process. He brought together the DAM physics community and US national laboratories around great challenging problems in various fields of physics.

The first conference day was dedicated to the many roles played by Daniel in various field of physics and to his involvement in the establishment of the basics science DAM/NNSA agreements. A dozen scientists from CEA DAM Ile-de-France, CEA CESTA, CEA Saclay, Madrid University and the Lawrence Livermore National Laboratory revisited their achievements performed in collaboration with Daniel Gogny in low and high energy nuclear physics (structure and reactions), electromagnetism, atomic and plasma physics. The following three days were more specifically devoted to low energy nuclear physics. This session gathered world-wide specialists in finite range interactions and the associated many-body theories, as well as nuclear reaction practitioners who base their modeling on these theories to improve the quality of the predicted nuclear reaction observables. This topical issue contains the scientific biography of Daniel Gogny which was evoked during the first day of the conference. The research works based on finite range nuclear interactions, both in nuclear structure and reaction fields, and discussed during the three following days of the conference are presented and developed in a collection of articles. The following topics are addressed:

- many-body methods for nuclear structure and reactions with finite range interactions;
- new finite range and density dependent interactions;
- $G$ -matrix: two- and three-body forces, di-nucleon structure;
- fission;
- nuclear structure input with the Gogny force: contributions in the field of nuclear data for energy and astrophysical applications.

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*Guest Editors*