

Benoît GALL - Curriculum Vitae



Benoît GALL is professor at Strasbourg University since 2006 and researcher at the Institut Pluridisciplinaire Hubert Curien (IPHC) Strasbourg. Since 2017, he is the "From Nuclei to stars" (DNE) research group leader. The activities of the DNE group are organized along four major research axes: study of reactions of nucleosynthesis interest, nuclear reaction dynamics, nuclear structure of exotic nuclei and synthesis & spectroscopy of the heaviest elements. He did his PhD in 1994 at Paris XI University (Orsay) on the Influence of rotation on Pairing-Correlations in the $A \approx 190$ mass region. His Habilitation to Direct Researches was defended at University Louis Pasteur Strasbourg in 2000. The subject was Mutual Interaction of deformation, rotation and pairing in neutron-rich nuclei of the $A \approx 100$ mass region.

His research activities are in low energy nuclear physics where he explores experimental aspects of nuclear spectroscopy with heavy ion accelerators and theoretical aspects with self-consistent mean field methods. They began, in the context of research on superdeformed nuclei (SD), by experimental and theoretical study of nuclear pairing phenomenon in the masses 190 and 150. The theory-experiment comparison in this area provided extremely rich information and allowed me to provide a framework for processing the evolution of pairing with rotational frequency of the nucleus.

He then addressed the very low cross-section spectroscopy question. He initiated and actively participated to the full digital instrumentation of JUROGAM gamma array and developed in 2005 a rotating target system compatible with gamma-ray spectroscopy arrays and small target material. This target finds now an extension in the superheavy nuclei program. With the study of K-isomers in ^{246}Fm they could achieve prompt spectroscopy with the lowest production cross section of 11 nb.

He is Responsible of the MIVOC international collaboration aiming at the development of intense ($>1 \mu\text{A}$) metallic beam of isotopic ^{50}Ti , ^{51}V , $^{52,54}\text{Cr}$ and ^{238}U . This international pluridisciplinary collaboration gathers expertise of 10-12 Chemists, ion beam specialists and Physicists from Finland, France, Japan and Russia. Isotopic beam of ^{50}Ti represents a key point to the synthesis of ^{256}Rf and the next super heavy elements. He worked for over 9 years with a chemist colleague from IPHC to establish an organometallic compound able to transport this isotope up to the ion source. The success of this development enabled in 2011 the first prompt spectroscopy of a superheavy nucleus, the ^{256}Rf . With his collaborators he recently developed an isotopic beam of ^{54}Cr ($Z=24$) @ FLNR Dubna 2018. These intense beams are essential to the success of the quest of new elements $Z=119-124$. This highly challenging physics can currently only be achieved in two places in the world: Dubna and RIKEN. Both laboratories will start in 2019 new intense beams machines.

He is Leader of the Oklo collaboration. This international collaboration is dedicated to the study of Oklo natural nuclear reactors and gathers activity of 3 physicists, one geologist and one geochemist from Algeria, France and Japan. His work on the OKLO natural nuclear reactors started with the thesis of S. E. Bentrudi he supervised with F. Gauthier-Lafaye. They explained, forty years after their discovery, the conditions that allowed the natural nuclear reactors at Oklo to start spontaneously two billion years ago. They continue to study these natural reactors on the basis of historical observations and modern simulation tools. In parallel, he is teaching nuclear reactor physics at Strasbourg University and was Vice-Head of the Strasbourg University Nuclear Reactor for its dismantling phase that took several years (2007-2012).

He directed 8 PhD Thesis & 2 Habilitations in nuclear structure, instrument developments and nuclear reactor physics (industrial & Oklo). His publication list comprises 140 publications, 145 oral contributions including 82 international conferences 61 oral contributions (conferences, workshops, schools, seminars). He also gives regularly conferences on the energy issues.

He was awarded the **First international Szymanski prize** given in the ENAM'08 international conference "for outstanding contribution to experimental in-beam studies of superdeformed, octupole deformed and heavy nuclei" and the **Second JINR prize 2015** for "Production of intense ion beams from metallic compounds from ECR ion sources using the MIVOC method".