Universität Duisburg-Essen • 45117 Essen

Fakultät für Physik

To the International Advisory Committee for the
Future of GANIL

LETTER OF INTENT

Dear Madam or Sir,

We, as users of the GANIL facility and members of the GANIL user group (GUEC), gladly respond to your invitation to summarize the importance of GANIL for our community and to address future developments and challenges.

We have been conducting research at GANIL since 2002. Our research interest concerns mainly the beam lines IRRSUD (injector exit) and SME (CSS1 exit), but we have also done extensive work at the ARIBE facility (source exit). All work is done in close collaboration with members of the CIMAP laboratory, co-authors of this letter of intent, and with a number of international collaborators, many of which have also signed this letter. Our joint work is typically supported by a variety of national and international funding agencies, is regularly disseminated in peer-reviewed journals as well as conference contributions and attracts worldwide attention.

As material scientists we conduct experiments at the GANIL facility to study surface effects of swift heavy ion irradiation, i.e., material response under dense electronic excitations without the component of ballistic collisions. An outstanding feature of the beamlines are the special high-precision irradiation geometries, which enable unique methods, e.g., of material manipulation on the nanometer scale and detailed studies of surfaces and various 2D materials under extreme conditions. These latter materials are foreseen in many future applications and swift heavy ions represent an important and unique tool for their modification. Ion beams as delivered by GANIL will thus not only allow experiments to answer important questions in basic research, they will also enable the development of important

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technologies, such as membranes for sensors, filters, and radiation resistant electronics.

All experiments in our field rely heavily on the access to both beam lines. The SME beam line delivers ion beams with kinetic energies where the energy loss is at the maximum of the Bragg peak, and therefore the energy deposited in the material is maximum at the surface. The IRRSUD beam line on the other hand, covers the energy range between the SME beam line and widely available van-de-Graff machines allowing us to study the ion-solid-interaction over a very large energy range. Furthermore, the ion energy at the IRRSUD beam line is below the Coulomb barrier, resulting in lower requirements for radiation protection and enabling immediate access to irradiated samples. In addition, both beamlines are equipped with a variety of advanced characterization techniques, many of which are operating online and in-situ providing key data for material science. Ion beams as delivered by GANIL will thus allow not only to answer important questions in basic research, they will also enable the development of important technologies, such as membranes for sensors, filters, and radiation resistant electronics.

For material science we foresee a huge potential of the GANIL facility as it combines high and low energy beamlines equipped with dedicated equipment. No such infrastructure is currently available anywhere else in the world. To strengthen and further develop the GANIL research platform in the future we believe that is important to provide beam time for material science on a regular basis and in several runs per year. Furthermore, the equipment needs to be continuously developed, in particular towards in-operando measurement techniques. Finally, we recommend to grant the community access to ions with higher energies, which results in energy losses beyond the Bragg peak. Until now access to beams with these energies has been very limited for interdisciplinary physics. In principle, experiments at these high energies can also be conducted at the GSI (Darmstadt, Germany) where however beam time for material science is constantly overbooked, severely limiting experiments in this energy range.

We close this letter of intent by expressing our strong support of GANIL as a unique and invaluable instrument for our future research. We are convinced that the development of GANIL beyond state-of-the-art will significantly drive the advancement in our field.

Yours sincerely,

Marika Schleberger
(Representative of the GANIL user executive committee GUEC)

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