

Diploma work in Applied Nuclear Physics

“Characterization of cerium-doped lanthanum-bromide detector for prompt fission gamma-ray measurements”

Engineering Programme / Master in Physics - Degree Project (Exjobb)

Applied Nuclear Physics 30 credits (20 weeks)

Nuclear fission is an excellent topic for understanding the physics of nuclear matter. The interplay between the fundamental forces of nature gives rise to extraordinary phenomena and reveals details about how nuclei are formed as well about their internal structure. Neutron and gamma-ray emission of highly excited fragments may improve our basic understanding of nuclear physics. In order to study the properties of prompt fission gamma rays, one needs accurate and well-characterized detectors. In fact, one fundamental pre-requisite for scientific advancement is the continuous development of novel detection systems. In this work, you will be able to both explore the specific detector properties and get an insight into detector technology in general.

The aim of the project is to fully characterize a brand new cerium-doped lanthanum-bromide (LaBr₃:Ce) detector, for the purpose of measuring prompt fission gamma-ray emission in nuclear fission. LaBr₃:Ce detectors are of great interest due to their excellent timing and energy resolutions. They are used for investigations on nuclear astro-physics and nucleo-synthesis, nuclear structure and exotic beams. The project work is performed in collaboration with the Joint Research Centre of the European Commission in Geel, Belgium. The JRC has a long standing-tradition in nuclear physics studies and hosts world-class facilities for nuclear-data measurements. The project grants you a unique opportunity to acquire knowledge in nuclear physics and experience by working close to the experts. State-of-the-art instrumentation is available for the successful completion of the project. After completed work onsite in Belgium (typical stay of 3-5 months), the defense of the diploma work is done in Uppsala. A peer-reviewed article is foreseen as a result from this work. Some support for living expenses may be granted. We welcome your applications through the below stated links.

Start date

As soon as possible, upon agreement.

HT16: a 3.5”×3.5” LaBr₃:Ce is available for characterization.

VT17: the biggest LaBr₃:Ce detector commercially available (3.5”×8”) will be characterized.

Contacts

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