Databases of statistical nuclear properties

Tuesday 17 June 2025 10:45 (15 minutes)

Nuclear data is the foundation for all applications involving nuclei. This includes everything from applied fields such as reactor simulations, weapons development, radiation safety, nuclear medicine to more fundamental applications such as cosmic-ray physics, nuclear astrophysics and nucleosynthesis.

To address the nuclear data needs a number of evaluated or compiled data libraries has been created, such as ENDF, JEFF, JENDL, TENDL, and many more. These libraries will typically follow experimental data when available and rely on theoretical predictions otherwise. Theoretical reaction cross sections relies on nuclear structure data such as the nuclear level density (NLD) and γ -ray strength function (γ SF). These properties have been a core research theme for the nuclear physics group at the University of Oslo. This has lead to the development of the Oslo method of measuring NLD and γ SFs. This technique is unique in that it is the only method that allows for simultaneous measurements of these properties. Over the last ~ 25 years the nuclear physics group have accumulated an impressive library of NLDs and γ SFs, with more than 100 different nuclei being measured.

In response to the new wealth of experimental data on both NLDs and γ SFs, the Nuclear Data Section at IAEA initiated a Coordinated Research Project (CRP) to create a γ SF database, and more recently a CRP to update NLD databases to include Oslo-method data. The Norwegian Nuclear Research Centre (NNRC) are involved in both project, providing the entire library of experimentally measured NLDs and γ SFs with the Oslo method.

Author: INGEBERG, Vetle Wegner (University of Oslo (NO))

Session Classification: Parallell A2