Contribution to the JEFF project

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Abstract: The contribution of JRC Geel to the JEFF project is twofold. At first we operate two accelerator facilities to provide a wide range of experimental data, such as energy dependent cross section data or prompt gamma spectra data. Another important aspect of our work is to provide evaluated parameters for the resonance region.
Here the focus lies on including as much as possible reliable and well described data from the literature. This can be either by including published data in the resonance shape analysis or when these data are not avaible, reported capture kernels can be combined with reported resonance parameters. An example is molybdenum. In literature results of measurements with isotopically enriched samples are available, but unfortunately neither the transmission not the capture yields are in the EXFOR database. By combining all published information with new measurements of natural samples, consistent and improved resonance parameters for all of its stable isotopes could be obtained.
For other elements we are developing a methodology where at first the limitations of energy dependence cross section data are carefully mapped. If information on parameters is not directly accessible though energy dependent data, choices on parameters are then guided by results of integral benchmarks. As example, for ^{238}U in recent works a significant over prediction of the reactivity loss (by around 800pcm) during depletion calculation when comparing JEFF-3.3 to the JEFF-3.1.1 library has been linked to biases in the radiation widths of the resonances. However from energy dependent cross section data an unambiguous determination of both the neutron and radiation width is not possible. As the neutron width is smaller than the radiation width, the radiation width has to be derived from the width of the observed resonance profile and the result is strongly influenced by corrections, such as Doppler broadening and experimental resolution. Progress on the work on such methodology will be reported.