David Knežević[♣]: Spectroscopic data and nuclear structure studies using (n_{th},2γ) reaction and two-step gamma cascade method

Accurate values for gamma ray transitions, level scheme, nuclear level density and radiative strength function are important in a wide array of applications, including astrophysical reactions, production of medical isotopes, rare isotope beams and reactor technology. One of the most suitable techniques for determination of these parameters is the two-step gamma-ray method based on the measurements of the two-step gamma-ray coincidences following thermal neutron capture. This technique can be used to search for new energy levels and gamma transitions, to place already known gamma transitions in the level scheme, constrain spin values of levels, as well as to determine nuclear level density and radiative strength function.

This technique was most recently succesfully applied to ^{94}Nb and ^{56}Mn in experiments conducted at the PGAA facility of Budapest Neutron Centre (BNC) of the Centre for Energy Research (EK), Budapest, Hungary and Technische Universität München, Forschungsneutronenquelle Heinz Maier-Leibnitz (FRM II), Garching, Germany, respectively. These two experiments combined had, among other results, over 50 new recommendations for energy levels and over 250 new recommendations for gamma transitions. These results proved that this technique can provide new, accurate data about level scheme and nuclear structure. Among future plans for usage of this technique is a proposed experiment at research reactor in Garching, Germany in order to investigate ^{108}Ag and ^{110}Ag nuclei, as well as publishing spectroscopic data from the experiment on ^{104}Rh, that was conducted at BNC.

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