Contribution ID: **5**   Type: **Submitted Oral**

Mini-Orange conversion electron setup for ISOLDE

Wednesday 25 November 2020 13:30 (20 minutes)

The measurement of conversion electrons adds additional observables in decay spectroscopy. High-resolution studies for electron energies of typically some hundreds keV are done best with LN2-cooled Si(Li) detectors located at the focal point of a magnetic transport system, e.g. a so-called Mini-Orange consisting of permanent magnets. The optical properties of Mini-Oranges (MO) enable an effective increase of the solid angle acceptance in combination with a reduction of the total electron rate, e.g. from β-decays or, in in-beam experiments, δ-electrons, by a suitable choice of a transmission function focused on the region of interest. In addition, a lead blocker in the direct line between source and detector suppresses hits by x- and γ-rays. As stand-alone device or combined with α-, β- and/or γ-detection, this allows for the determination of E0 transition strengths or conversion coefficients which are of particular interest e.g. in regions of shape coexistence.

Such a setup comprising three MOs is currently under recommissioning at TU Darmstadt. Parts of this MO setup have been used by us at ISOLDE already in the past to study E0 strengths [1] and isomeric transitions of high multipolarity [2]. Depending on the physics case, additional devices, i.e. HPGe, LaBr$_3$(Ce), Si or plastic detectors, are added. We intend to install this setup as travelling device at the LA1 or LA2 low-energy beamline at ISOLDE. The status of the project will be presented.

[1] W. Schwerdtfeger et al., Phys. Rev. Lett. 103, 012501 (2009)
[2] K. Wimmer et al., Phys. Rev. C 84, 014329 (2011)

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Session Classification: Contributed Talks