Contribution ID : **98** Type : **Invited Oral**

Absolute electromagnetic transition rates in semi-magic N = 50 and 126 isotones as a test for $(\pi_{9/2})^n$ single particle calculations.

Tuesday, 18 July 2023 10:00 (25)

Assuming the presence of one- and two-body interactions, single-j calculations for $(j)^n$ configurations with n = 1,..,2j+1 can be performed using a semi-empirical approach, provided that the energies and absolute electromagnetic transition rates are known for the two-particle (hole) nucleus. Using those and the coefficients of fractional parentage, all needed matrix elements for the $(j)^n$ configurations can be predicted.

At the Cologne Tandem Accelerator of the Institute for Nuclear Physics we have tested these relations by measuring lifetimes of excited states in the $(\pi_{9/2})^n$ isotones with N = 50 and N = 126 over the last years. We started the studies in the two-proton nucleus ^{210}Po where the abnormal B(E2:$2_1^+ \rightarrow 0_1^+$) value was remeasured, providing important input for the other configurations [1]. Then lifetimes of excited states in ^{211}At were measured using the electronic γ-γ fast timing technique, the Recoil Distance Doppler Shift (RDDS) method, and the Doppler Shift Attenuation (DSA) method~[2,3]. Very good agreement with the analytical single-j calculation is obtained. We will also shortly report on our study of ^{213}Fr.

For N=50 isotones, we recently started by remeasuring the previously unknown B(E2:$4_1^+ \rightarrow 2_1^+$) value needed for the prediction of other N=50 isotones with Z= 41-50 [4]. We will also report on experiments on ^{93}Tc, ^{94}Ru and ^{96}Pd, as well on ^{94}Ru and ^{95}Rh at FAIR Phase-0 [5].\\

[1] D. Kocheva, G. Rainovski, J. Jolie, N. Pietralla, A. Blazhev, *et al.* Eur. Phys. J. A 53 (2017) 175
[2] V. Karayonchev, A. Blazhev, A. Esmaylzadeh, J. Jolie, M. Dannhoff, F. Diel, F. Dunkel, C. Fransen, L. M. Gerhard, R.-B. Gerst, L. Knafla, L. Kornwebel, C. Müller-Gatermann, J.-M. Régis, N. Warr, K. O. Zell, M. Stoyanova, and P. Van Isacker, Phys. Rev. C 99 (2019) 024326
[3] V. Karayonchev, A. Blazhev, J. Jolie, A. Dewald, A. Esmaylzadeh, C. Fransen, G. Häfner, L. Knafla, C. Müller-Gatermann, G. Rainovski, J. -M. Régis, K. Schomacker, and P. Van Isacker, Phys. Rev. C 106, (2022) 044321.
[4] M. Ley *et al.* in preparation.
[5] B. Das *et al.*, Phys. Rev. C 105 (2022) L031304 and submitted.

∗: present address: Argonne National Laboratory, Chicago, USA

\end{document}

Primary author(s) : JOLIE, Jan (IKP, Universitaet zu Koeln,); KARAYONCHEV, Vasil* (Zuelpicher Str. 77, D-50937 Koeln, Germany); BLAZHEV, Andrey (Universitaet zu Koeln); ESMAYLZADEH, Arwin (IKP, Universitaet zu Koeln); HARTER, Andreas (IKP, Universitaet zu Koeln); KNAFLA, Lukas (IKP, Universitaet zu Koeln); LEY, Mario (IKP, Universitaet zu Koeln); REGIS, Jean-Marc (IKP, Universitaet zu Koeln,); KOCHEVA, Diana (Faculty of Physics, St. Kliment Ohridski University of Sofia,); RAINOVSKI, Georgi (Faculty of Physics, St. Kliment Ohridski University of Sofia,); VAN ISACKER, Pieter (GANIL, CEA/DRF–CNRS/IN2P3,)

Presenter(s) : JOLIE, Jan (IKP, Universitaet zu Koeln,)

Session Classification : Session 4

Track Classification : Experimental Nuclear Structure