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Shape coexistance in the N=Z nucleus ^{80}Zr

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State-of-the-art beyond mean field methods with the Gogny D1S interaction has predicted for the N=Z ^{80}Zr nucleus five 0^+ states corresponding to different nuclear shapes within 2.25 MeV, where several rotational and γ-bands are built upon those five 0+ states [1]. We propose to study the rich low-lying energy spectrum of ^{80}Zr, by using a 1n and 2n knock-out reaction from ^{81,82}Zr, respectively. The ^{81,82}Zr fragments will be produced from the fragmentation of a primary ^{124}Xe beam at 345 MeV.A on a ^{9}Be target. The reaction fragments will be separated and identified by he BigRIPS separator. The fragments of interest will impinge on a ^{9}Be target surrounded by a high-purity germanium array (MINIBALL). The final reaction products will be identified by the ZeroDegree spectrometer. Currently T.R. Rodriguez together with J. Tostevin are calculating the spectroscopic factors for the various excited states in order to quantify the population to the various low-lying excited states in ^{80}Zr. Gamma-gamma coincidences, together with angular gamma distributions will help us to build up the level scheme of ^{80}Zr at low-energies.

[1] T. R. Rodríguez and J. Luis Egido Physics Letters B 705 (2011) 255–259

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