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# Competing excitation modes in A $\sim$ 80 region

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The level structure of neutron rich nucleus, $^{78}$As has been investigated at the low- and medium-spin regime through the alpha-induced fusion evaporation reaction, at varying beam energies, using the mylar backed enriched $^{76}$Ge target. The de-excited gamma rays were detected using the INGA (Indian National Gamma Array) spectrometer stationed at VECC, Kolkata, India. The level scheme of $^{78}$As has been constructed using the standard gamma-ray spectroscopic techniques. The use of both Clover and LEPS detectors provided additional
scope for proper identification and unambiguous placements of the low-energy gamma transitions (having $E_\gamma \leq 80$ keV) in the level scheme. The observed low-lying, low-spin level structure is found to be highly irregular suggesting the dominance of single-particle excitation modes. The onsets of regular positive- and negative-parity dipole band-like structures are found to be developed at the medium-spin excitation regime. Based on the detail theoretical calculations (shell model calculations, TRS calculations, and the semi-empirical calculations for shears mechanism) and the level structure systematics, these band-like structures are interpreted to originate from the novel excitation mode known as "stapler"-like shears mechanism. It is interesting to note that while both the intruder orbitals, $\pi(1g_{9/2})$ and $\nu(1g_{9/2})$ are found to have dominnat contributions in generating the positive-parity states, the intruder $\pi(1g_{9/2})$ orbital does not seem to have any role in generating the negative-parity states. The details about the level structure of $^{78}$As obtained from the present investigation will be presented at the conference.

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