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Exploring the high spin states of ^{88}Zr

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\noindent{\underline{The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy}}

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% insert the authors here. The presenter is underlined
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Understanding of the complex structure and dynamics of a nuclear system
requires investigation of motion of the constituent nucleons and their mutual
interactions. The high spin states of a nucleus near shell closure provide unique
test bench for exclusively studying the excitations of the valence shell nucleons
in the nuclear mean field and the residual interactions. In addition, a number of
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interesting phenomena are observed in doubly closed shell nuclei, like, the evolution of collectivity and presence of high spin isomers, to mention a few \cite{heyde11}. Nuclei around ^{90}Zr having $Z = 40$ sub-shell closure and $N = 50$ major shell closure are perfect candidates to probe these emergent phenomena \cite{ssaha12}. Recently, the high spin states of ^{88}Zr were populated with ^{13}C(^{80}Se,$5n$) reaction using ^{13}C beam at 60 MeV from TIFR-BARC pelletron facility \cite{ssaha14}. The γ-rays emitted from the residual nuclei were detected using 18 Compton suppressed clover HPGe array, know as INGA \cite{pa12}. The energy, spin and parity of several states of ^{88}Zr have been assigned. The results have been compared with large scale shell model calculations for full unrestricted f_5pg_9 model space using two recently developed interactions JUN45 \cite{honma09} and jj44b \cite{brown}. Although, there are overall good agreement between the calculated and the experimental results, at high spin their differences have been observed to be increased. To explore further higher spin states a more symmetric reaction was performed using ^{30}Si beam and ^{65}Cu target at 137 MeV. A number of high energy transitions have been observed indicating contribution from particle excitation across the 50 shell gap. In this conference, the spectroscopic study of ^{88}Zr produced using the two different reactions will be presented and the results will be interpreted using large scale shell model calculations.

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