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Neutron knockout on neutron-deficient tin beams

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Characterizing the nature of single-particle states outside of double shell closures is essential to a fundamental understanding of nuclear structure. This is especially true for those doubly magic nuclei that lie far from stability and where the shell closures influence nucleo-synthetic pathways. The region around 100Sn is one of the most important due to the proximity of the N=Z=50 magic numbers, the proton-drip line, and the end of the rp-process. However, owing to the low production rates, there is a paucity of spectroscopic information and no firm spin-parity assignment for ground states of odd-A isotopes close to 100Sn. Neutron knockout reaction experiments on beams of 108,106Sn have been performed at the NSCL. By measuring gamma rays and momentum distributions from reaction residues, the spins of the ground and first excited states for 107,105Sn have been established. The results also show a degree of mixing in the ground states of the isotopes 108,106Sn between the d5/2 and g7/2 single particle-states. Momentum distributions, compared to Eikonal-model reaction calculations, and cross sections will be presented.

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