

Normal occupancy of deeply bound valence neutrons in ^{37}Ca

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The ground state and first excited $2+$ state in proton-rich ^{36}Ca have been studied at Ganil by gamma-ray spectroscopy of one-neutron knock-out reactions from deeply bound states in ^{37}Ca at intermediate energy. The $2+$ energy in ^{36}Ca was found to be consistent with a sizeable $N=16$ gap similar to the $Z=16$ one observed in the mirror nucleus ^{36}S . Partial cross-sections and momentum distributions of the knock-out reactions to both the ground state and the first excited $2+$ state have been measured and the angular momentum of the two populated states identified. In contrast with previously reported cases, the extracted spectroscopic factors and their comparison to shell-model spectroscopic factors are found to be consistent with the trend observed for stable and near-magic nuclei.

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