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Spectroscopy of ^{33}Mg with knockout reactions

The structure of ^{33}Mg was investigated by means of two knockout reactions, one-neutron removal from ^{34}Mg and one-proton removal from ^{34}Al . Using comparative analysis of the population of observed excited states in the residual ^{33}Mg , the nature of these states can be deciphered. In addition, the long-standing controversy about the parity of the ^{33}Mg ground state is resolved using momentum distribution analysis, showing a clear signature for negative parity. Partial cross section measurements are compared with the results of eikonal reaction theory combined with large-scale shell model calculations of this complex nucleus located in the island of inversion, where configuration mixing plays a major role.

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