Nuclear structure studies of $^{141}$Ce and $^{147}$Sm using deep-inelastic collisions$^1$ E. J. GASS, Stony Brook University, E. A. MCCUTCHAN, A. A. SON-ZOGNI, Brookhaven National Laboratory, W. LOVELAND, J. S. BARRETT, R. YANEZ, Oregon State University, C. J. CHIARA, J. L. HARKER, W. B. WALTHERS, University of Maryland, S. ZHU, A. D. AYANGEAKEAI, M. P. CARPENTER, J. P. GREENE, R. V. F. JANSSENS, T. LAURITSEN, Argonne National Laboratory, H. NADJA, Université de Strasbourg — Nuclei with a few valence nucleons outside of the magic numbers are essential for testing the nuclear shell model and gathering information on the residual interactions and energies of single-particle levels. The present work focused on the high-spin structures of $^{141}$Ce ($N = 83$) and $^{147}$Sm ($N = 85$). These nuclei are not produced by heavy-ion fusion-evaporation or fission reactions, therefore little was known about their high-spin structure. A deep-inelastic reaction using a beam of $^{136}$Xe incident on a thick target of $^{208}$Pb was used to populate excited states in the nuclei. The Gammasphere array at Argonne National Laboratory was used to detect the resulting de-excitation -ray transitions. The level schemes of both nuclei were significantly extended to high angular momentum and high excitation energy. In $^{141}$Ce, this included a number of states built on the $i_{13/2}$, 1369-keV level. Results of the present analysis will be compared to state-of-the-art shell model calculations.

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