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High spin structure of the neutron-rich nucleus ^{139}Cs JOSEPH HAMILTON, SHAOHUA LIU, AKUNURI RAMAYYA, Y.X. LUO, J.K. HWANG, Vanderbilt University, A. COVELLO, A. GARGANO, N. ITACO, Complesso Universitario di Monte S. Angelo, Napoli, Italy, J.O. RASMUSSEN, Lawrence Berkeley National Laboratory, A.V. DANIEL, G.M. TER-AKOPIAN, JINR, Dubna, Russia, S.J. ZHU, Tsinghua University, China, W.C. MA, Mississippi State University — High spin excited states in the neutron-rich nucleus ^{139}Cs were investigated from a study of the prompt γ rays emitted in the spontaneous fission of ^{252}Cf with the Gammasphere detector array. Ten new excited levels with eighteen new deexciting transitions were observed and the level scheme of ^{139}Cs was extended up to 4670 keV. Spins and parities of levels in ^{139}Cs were firmly assigned up to $25/2^+$ based on measurements of the angular correlations and an internal conversion coefficient. Shell model calculations were performed to interpret the experimental results. A good agreement between theory and experiment was found in the level energies and the mixing ratio of the 595.4 keV transition. This agreement shows the power of the shell model extended to this nucleus with five protons and two neutrons beyond the double magic ^{132}Sn core. The present experiment has provided further evidence for the similarity of the spectroscopy of the $N = 84$ isotones, which is clearly born out by our study.

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