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Study of low-lying excited states in ¹³⁹La via the $(n, n'\gamma)$ reaction¹ S.F. ASHLEY, J.N. ORCE, B. CRIDER, E. ELHAMI, M.T. MCELLISTREM, S. MUKHOPADHYAY, Dept. of Physics and Astronomy, University of Kentucky, Lexington KY 40506-0055, E. PETERS, Dept. of Chemistry, University of Kentucky, S.W. YATES, Dept. of Physics and Astronomy and Dept. of Chemistry, University of Kentucky — An observable result of Pauli-blocking in atomic nuclei [1] is a reduction in the transition rates between equivalent phonon excitations in odd-A nuclei and even-even nuclei. In particular, studies of low-lying $J^{\pi} = 1^{-}$ states in ¹⁴¹Pr [2,3], imply that the $B(E1:1^{-} \rightarrow 0_{1}^{+})$ values associated with decays from states with $[[2^{+} \otimes 3^{-}] \otimes particle]_{J^{\pi}=1^{-}}$ configurations are $\sim 52 - 83\%$ of the $B(E1:1^{-} \rightarrow 0_{1}^{+})$ value associated with decay from the $[2^{+} \otimes 3^{-}]_{J^{\pi}=1^{-}}$ state in ¹⁴⁰Ce. This presentation will focus on lifetimes deduced from an angular-distribution measurement of ¹³⁹La, via the $(n, n'\gamma)$ reaction with $E_n = 2.0$ MeV, and a comparative interpretation of Pauli-blocking in ¹³⁹La and ¹⁴¹Pr will be drawn.

[1] V.G. Soloviev, Theory of Atomic Nuclei: Quasiparticles and Phonons, IOP Publishing (Bristol, United Kingdom), (1992)

[2] M. Scheck et al., Phys. Rev. C 75, 044313 (2007)

[3] M. Scheck et al., submitted to Phys. Rev. C

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