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Multi-quasiparticle isomers involving proton-particle and neutron-hole configurations in ^{131}I and ^{133}I H. WATANABE, RIKEN, G.J. LANE, G.D. DRACOULIS, A.P. BYRNE, P. NIEMINEN, ANU, F.G. KONDEV, ANL, K. OGAWA, RIKEN, M.P. CARPENTER, R.V.F. JANSSENS, T. LAURITSEN, D. SEWERYNIAK, S. ZHU, ANL, P. CHOWDHURY, UMASS — The iodine isotopes with Z = 53 have attracted considerable interest because they exhibit a transition from more collective nature in the middle of the neutron shell to spherical shell-model structure as the number of neutrons increases toward the N = 82 closed shell. We have populated excited states in $^{131}I_{78}$ and $^{133}I_{80}$ using multi-nucleon transfer from ^{136}Xe, with the aim of understanding the effect of neutron holes on nuclear structure. By means of time-correlated γ-ray coincidence spectroscopy and the measurement of γ-ray angular correlations, a $J^\pi = 19/2^-$ isomer at 1918 keV, with a half-life of 24(1) μs, has been identified in ^{131}I, as well as nanosecond isomers with $23/2^+$ in both isotopes. A $T_{1/2}$ = 25(3) ns isomer at 4308 keV in ^{131}I is suggested to have $J^\pi = (31/2^-, 33/2^-)$ and is primarily attributed to the coupling of an odd proton in the $d_{5/2}$ or $g_{7/2}$ orbit with the $(\pi^2)_{0+}$ $(\nu h_{11/2}^{-3}\ d_{3/2}^{-1})_{15-}$ configuration in ^{130}Te responsible for the 15^- isomer in that nucleus. In this presentation, the observed level properties will be compared with predictions of a shell-model calculation based on a j-j coupling scheme.

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