

Abstract Submitted  
for the APR08 Meeting of  
The American Physical Society

**Single-particle states outside the N=82 core** BENJAMIN KAY, JOHN SCHIFFER, Argonne, SEAN FREEMAN, Manchester, JASON CLARK, CATHERINE DEIBEL, ANDREAS HEINZ, ANUJ PARIKH, CHRIS WREDE, Yale — A systematic study of the high- $j$  single-neutron states outside the  $N=82$  isotones was carried out with the  $(\alpha, {}^3\text{He})$  reaction on  ${}^{138}\text{Ba}$ ,  ${}^{140}\text{Ce}$ ,  ${}^{142}\text{Nd}$  and  ${}^{144}\text{Sm}$  at a beam energy of 51 MeV. The separation between the  $i_{13/2}$  and  $h_{9/2}$  single-neutron states, was measured. Spectroscopic factors for the states populated in the high- $\ell$  transfers indicate significant fragmentation for the  $\ell=5$  and  $\ell=6$  strength, but the summed strengths on these targets are constant. The centroids of the single-particle strength display a change in the relative energies of these two nodeless single-particle orbits, similar to the trend observed in the Sb isotopes<sup>1</sup>. The centroid shifts with neutron number are in agreement with those expected from the monopole term in the tensor component of the residual interaction between nucleons of Otsuka et al.<sup>2</sup>. This research was supported by the DOE Office of Nuclear Physics under Contract Nos. DE-FG02-91ER-40609 and DE-AC02-06CH11357. <sup>1</sup>J.P. Schiffer et al. Phys. Rev. Lett. **92**, 162501 (2004). <sup>2</sup>T. Otsuka et al. Phys. Rev. Lett. **95**, 232502 (2005).

John Schiffer  
Argonne National Laboratory

Date submitted: 11 Jan 2008

Electronic form version 1.4