

Abstract Submitted
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Quark-lattice Nuclear Model Applications – Neutron Absorption, Radioactive Decay, and Asymmetric Fission RONDO N. JEFFERY¹, Weber State Univ (ret.), JERRY R. MONTGOMERY² — The new quark-lattice model of the nucleus has been extended through heavy nuclei. Three specific issues illustrate the power of the model: (1) large thermal neutron absorption cross sections, (2) radioactive decay of K-40, and (3) asymmetric fission. Large neutron absorption cross sections occur when there are openings in the lattice into which neutrons can naturally fit. Examples are He-3, Li-6, and B-10. B-10 results in neutron-activated fission. The decay of K-40 into either Ar-40 or Ca-40 illustrates the role spin plays in determining nuclear structure. K-40 has net spin 4 whereas Ar-40 and Ca-40 both have spin 0. Some models are used to show these structures. The fission of heavy nuclei occurs, in the lattice model, as the core of the structure separates from the loosely-packed ends. The ends are repacked into a smaller nucleus, which forms the lighter of the two daughter fragments. This explains why the lighter fragment mass increases with total mass whereas the heavier fragment mass remains relatively constant.

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