

DNP08-2008-000079

Abstract for an Invited Paper
for the DNP08 Meeting of
the American Physical Society

The study of neutron quantum states in the Earth's gravitational field

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I will discuss the discovery and characterization of gravitational bound neutron states. In the previous experiments, the lowest neutron quantum states in the gravitational potential were distinguished and characterized by a measurement of their spatial extent. The future detection of resonant transitions between these neutron quantum states with the help of the GRANIT spectrometer (under construction) promises to give further and more precise information. Here, transitions between different quantum states induced by RF pulses shall be observed. These measurements are not only demonstrations of standard quantum mechanics. I will discuss applications of these measurements in the search for spin-dependent short-range interactions.