

OPTIMIZATION AND NEW
APPLICATIONS OF A MAGNETIC
TRAP FOR ULTRA-COLD NEUTRONS

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S u m m a r y

We discuss some problems related to the physics and dynamic behavior of ultra-cold neutrons (UCNs) in a magnetic trap. First, we present the results of our computer simulations for a permanent-magnet neutron magnetic trap suggested by J.D. Bowman and P.L. Walstrom. We demonstrate how to optimize parameters in order to minimize the “cleaning time” in the trap. Next, we propose using a magnetic trap for UCNs as an ultra-sensitive method for measuring the neutron magnetic resonance. We also propose using this method to measure the decoherence time of neutron spins and to measure more accurately the neutron gyromagnetic ratio.