

Nuclear Seminar

*******NOTE NEW TIME*******

Nov 5th @ 4:00 PM in RM 179

Precision Measurements with Noble Gas Masers

I will discuss experiments with a $^{129}\text{Xe}/^3\text{He}$ Zeeman maser to search for violations of Lorentz and CPT symmetry, as well as new spin-dependent interactions. Experimental investigations of Lorentz and CPT symmetry provide important tests of the framework of the Standard Model of particle physics and theories of gravity. To date, our measurements with the $^{129}\text{Xe}/^3\text{He}$ Zeeman maser set stringent limits on rotation- and boost-dependent Lorentz and CPT violation involving the neutron, consistent with no effect at the level of 10^{-31} GeV and 10^{-27} GeV, respectively. Upgrades to the system should lead to an order-of-magnitude improvement in sensitivity to Lorentz and CPT violation. We have also used the $^{129}\text{Xe}/^3\text{He}$ Zeeman maser to set limits on the coupling strength of neutron spin-spin interactions mediated by light pseudoscalar particles like the axion at the level of about 10^{-5} the size of the magnetic dipole-dipole interaction

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