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Prospects of optically polarizing nuclear spins in noble gas solids

Inert gases frozen at cryogenic temperatures have been used to trap and study atoms and molecules for over 60 years. In particular, noble gas solids (NGS) are a promising medium for the capture, detection, and manipulation of atoms, molecules, and nuclear spins. They provide stable, chemically inert, & efficient confinement for a wide variety of guest species. Because NGS are transparent at optical wavelengths, the guest species can be probed using lasers. Potential applications include measurements of rare nuclear reactions and tests of fundamental symmetries. In this talk, I will present our first studies of probing Ytterbium (Yb) atoms in frozen solid Neon and our future plans to optically probe molecules such as BaO and YbO.

Summary

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