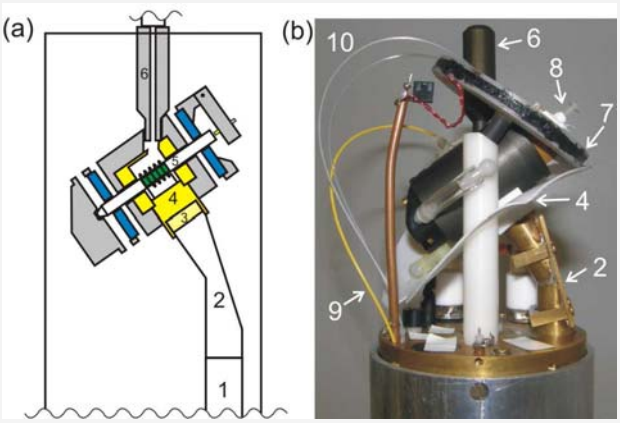
Physics and Astronomy Colloquium Series



Dynamic Nuclear Polarization (DNP) for Solid-state NMR of Biological Samples

Friday December 2nd, 2016, 3-4:15 pm

George Mason University, Exploratory Hall L111

Refreshments before talk

Kent R. Thurber, PhD

Laboratory of Chemical Physics, NIDDK, NIH

Abstract

Dynamic Nuclear Polarization (DNP) can increase Nuclear Magnetic Resonance (NMR) signals by 100-fold or more by transferring spin polarization from electron spins to nuclear spins. We have constructed a NMR probe that allows cooling the sample to 25 K, while also spinning the sample at the magic angle (MAS) at 7 kHz. To create DNP, electron spins in the sample are saturated with 264 GHz microwaves from an Extended Interaction Oscillator (EIO). The cross effect DNP mechanism with magic-angle spinning (MAS) of the sample can be understood using the Landau-Zener formula. Using DNP allows us to acquire 2D NMR spectra of relatively dilute proteins frozen in water/glycerol solution, in hours, rather than weeks. I will discuss current work on preparing samples for DNP by rapid mixing and freezing, with the aim of trapping intermediate states in biological samples (such as partially folded proteins).

This event is free and open to the public. Questions? Contact ssatyapa@gmu.edu