Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

High Pressure EPR for Probing the Magnetic Anisotropy in Single Molecule Magnets[1] LAKSHMI BHASKARAN, Florida State University, BIANCA TROCIEWITZ, THIERRY DUBROCA, National High Magnetic Field Laboratory, STEPHEN HILL, Florida State University — Single-molecule magnets (SMM) are potential candidates for nanoscale magnetic information storage, and a platform for studying classical and quantum behaviors at the mesoscopic scale. Varying the structures of these molecules by chemical modification can give rise to changes in their magnetic properties. However, this approach can be unpredictable, leaving very little control via chemical synthesis. An alternate approach is to exert physical pressure. This convenient tool can be used to vary crystal packing, local coordination geometries, as well as inter-ion and intermolecular interactions without changing the chemical composition of a SMM. Moreover, pressure in combination with Electron Paramagnetic Resonance (EPR), can be employed to better understand the factors that control magnetic anisotropy, both at the single-ion level and in exchange-coupled molecules. Here we present a microwave cavity integrated with a diamond anvil cell with a pressure range up to 1.5 GPa. As an example we show results from single crystal high field EPR experiments performed on an exchange coupled system, $[Fe_8O_2(OH)_{12}(tacn)_6]Br_8.9H_2O$, better known as Fe_8 with a giant spin of S=10. The obtained pressure-dependent results will be discussed.

[1]National High Magnetic Field Laboratory

Lakshmi Bhaskaran
Florida State University

Date submitted: 11 Nov 2016 Electronic form version 1.4