

Materials, Energy and Life: Entertaining Aspects of High Magnetic Field Research

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Title: Materials, Energy and Life: Entertaining Aspects of High Magnetic Field Research.

When: 27 March, 2017, 15h00

Where: Sala de Conferencias, Módulo 00, Facultad de Ciencias.

Speaker: Greg Boebinger, Professor of Physics, Florida State University and University of Florida. Director, National High Magnetic Field Laboratory.

ABSTRACT:

The MagLab exists to provide its international user community with unique magnets and expertise spanning condensed matter physics, materials research, chemistry, biochemistry, biology, and biomedicine. We invent new materials in order to generate magnetic fields exceeding two million times the Earth's magnetic field. This talk seeks to answer the question, "How and why would anyone want to do such a thing?" Illustrative examples from the portfolio of user research at the MagLab will include:

MATERIALS: tweaking macroscopic quantum phenomena in two-dimensional square lattices of copper and oxygen to achieve high-temperature superconductivity or magnetic Bose-Einstein condensation.

ENERGY: analyzing nature's most complex fluids, including petroleum, to improve utilization and mitigate pollution.

LIFE: tracking sodium and gadolinium quantum dots to revolutionize magnetic resonance imaging. During the talk, we anticipate that jokes will be told.

The portion of the talk that surveys my own work on high-temperature superconductivity uses magnetic fields to suppress the superconductivity with a goal of revealing the Wizard who pulls the strings behind the curtain. This work is a collaboration with Camilla Moir, Scott Riggs, Arkady Shekter, Oskar Vafek and Jon Kemper of the MagLab branch at Florida State University; Jon Betts, Albert Migliori and Fedor Balakirev of the MagLab branch at Los Alamos National Laboratory; and W. N. Hardy, Ruixing Liang and Doug Bonn of the University of British Columbia.