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Extreme Material Physical Properties and Measurements above 100 tesla[1] CHARLES MIELKE, NHMFL-PFF (LANL) — The National High Magnetic Field Laboratory (NHMFL) Pulsed Field Facility (PFF) at Los Alamos National Laboratory (LANL) offers extreme environments of ultra high magnetic fields above 100 tesla by use of the Single Turn method as well as fields approaching 100 tesla with more complex methods. The challenge of metrology in the extreme magnetic field generating devices is complicated by the millions of amperes of current and tens of thousands of volts that are required to deliver the pulsed power needed for field generation. Methods of detecting physical properties of materials are essential parts of the science that seeks to understand and eventually control the fundamental functionality of materials in extreme environments. De-coupling the signal of the sample from the electro-magnetic interference associated with the magnet system is required to make these state-of-the-art magnetic fields useful to scientists studying materials in high magnetic fields. The cutting edge methods that are being used as well as methods in development will be presented with recent results in Graphene and High-Tc superconductors along with the methods and challenges.

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