AC Susceptibility for Dilution Refrigerator (AC DR) (PPMS®/DynaCool™)

The AC Susceptibility Option for the Dilution Refrigerator (AC DR) brings the easy usability of the ACMS II option into the milli-Kelvin temperature range. Thermally anchoring the coil set to the puck interface rather than the DR sample stage, and using superconducting wires for the drive coils, lead to there being virtually no heat load on the DR. This allows mutual induction-based determination of the AC susceptibility of samples for frequencies between 10 Hz and 10 kHz down to 50 mK. Sophisticated software algorithms allow for automatic background removal and unprecedented phase accuracy in this temperature range.

Features
- Automated AC Susceptibility measurements between 10 Hz and 10 kHz
- Automatic background removal results in accurate phase information
- Temperature range 50 mK to 4 K, DC fields up to 12 T
- Sapphire sample stages (for parallel and perpendicular sample mounting)
In-phase susceptibility for the superconducting transition of an Ir$_{1-x}$Ru$_x$ sample measured using an AC excitation of 10 mOe and a frequency of 10 kHz for various DC background fields. The lower graph highlights the noise level for the zero field data. The peak to peak scatter of the data is about 5x10$^{-6}$ emu/Oe, corresponding to 5x10$^{-8}$ emu in absolute signal.

(Sample provided by Milton S. Torikachvili of San Diego State University)