

# First Order Reversal Curve (FORC) Measurements

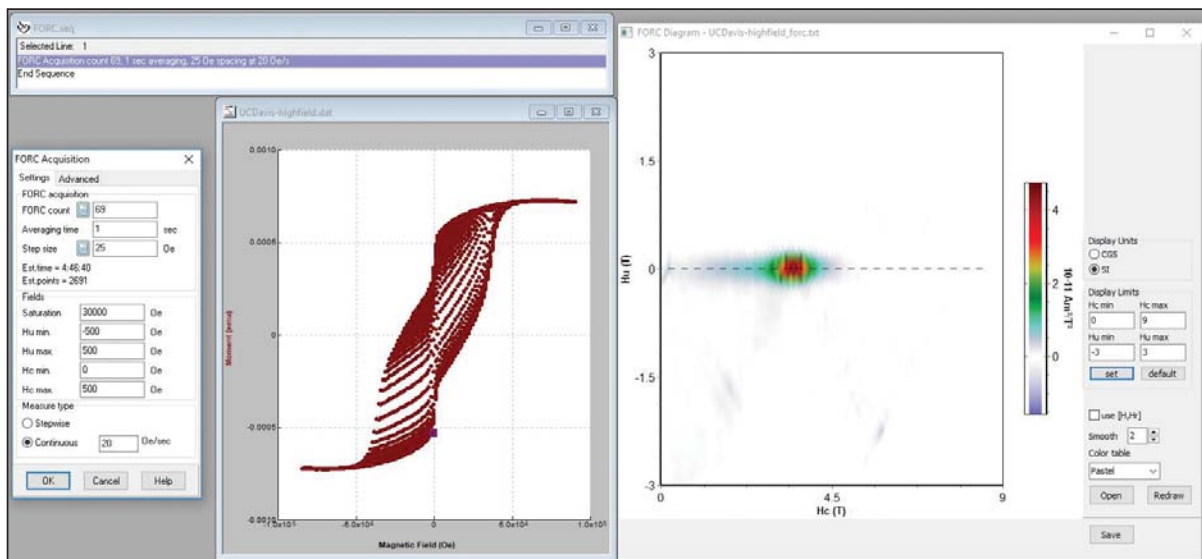
**First Order Reversal Curve (FORC) measurements** and their subsequent analysis provide additional insights into the magnetic reversal mechanisms of bulk, thin film, and nano-patterned samples that conventional major hysteresis loops cannot, including:

- Providing a qualitative/quantitative fingerprint of the magnetic reversal mechanisms
- Separating reversible and irreversible switching mechanisms
- Calculating reversal mechanism phase fractions
- Calculating coercivity and interaction field distributions

## Key Features:

- Fully automated FORC acquisition using MultiVu
  - FORC distributions calculated “on the fly” during a measurement
  - Change between the ( $H_c$ ,  $H_u$ ) and ( $H$ ,  $H_r$ ) coordinate systems
  - Change the smoothing factor, color scheme, measurement units
- Compatible with VSM (standard and large bore coilsets) and VSM oven
- Compatible with PPMS<sup>®</sup>, VersaLab<sup>™</sup>, and DynaCool<sup>™</sup> allowing for FORC measurements up to 16 T spanning 1.8 to 1000 K
- Output file also preformatted for easy import into FORCinel post-processing software

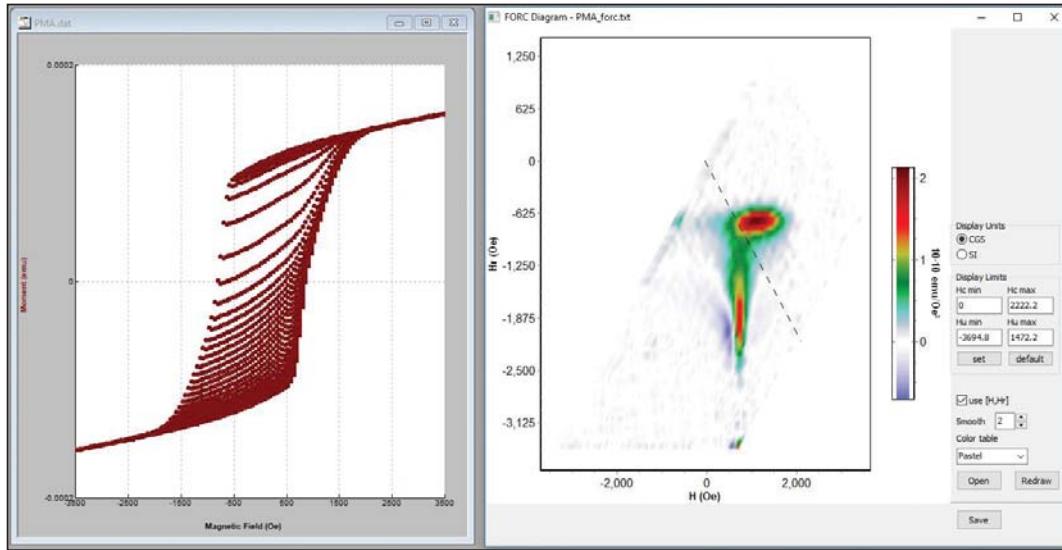
## MultiVu User Interface



## Example FORC measurements on two canonical systems:

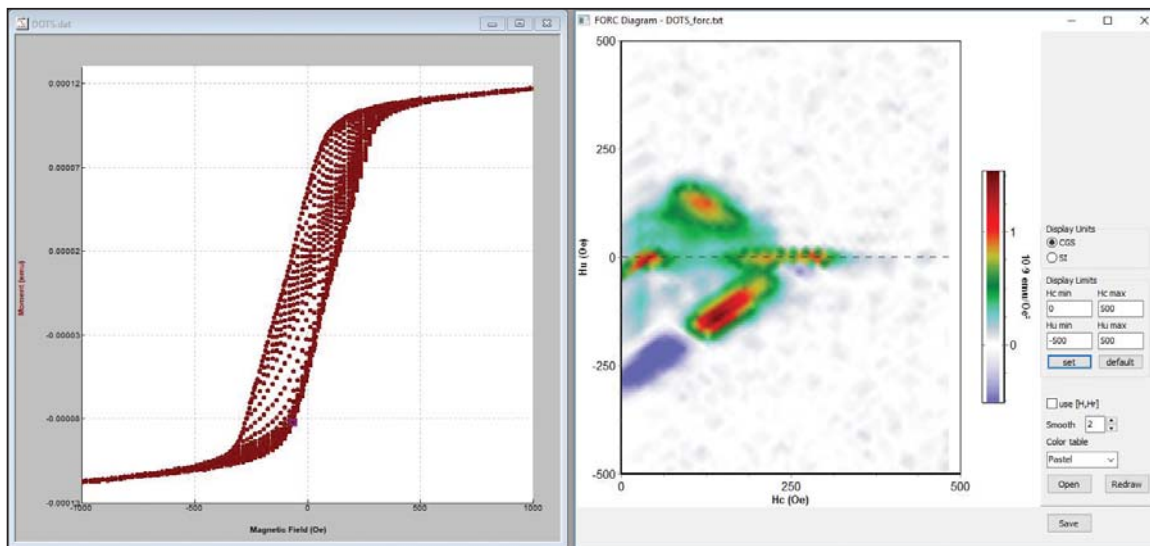
Si/Pd(15 nm)/[Co(0.5 nm)/Pd(1 nm)]<sub>10</sub>

- Thin film exhibiting perpendicular magnetic anisotropy



Si/Pd(15 nm)/Co(32 nm) thin film patterned into ~560 nm diameter disks

- Magnetic disks sample exhibiting vortex state reversal



- Samples provided by Prof. Kai Liu, UC Davis

PPMS EverCool DynaCool VersaLab

Model	P181, D181, V181
First Order Reversal Curve (FORC):	
Magnetic Field Range	Up to 16T
Temperature Range	1.8 – 1000 K (with oven option)
Sensitivity - Standard Coil (6.3mm)	6 x 10 <sup>-7</sup> emu
Sensitivity - Large Bore Coil (12mm)	1.5 x 10 <sup>-6</sup> emu
Sensitivity - Oven Option	< 1 x 10 <sup>-5</sup> emu



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Specifications subject to change without notice  
1073-100 Rev. A2 (June 2018)