Recent developments in FORC-based magnetic modeling

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In this talk we review two recent developments in FORC based magnetic modeling.

(1) Spin-wave renormalization effects on finite element magnetic modeling. Finite element modeling is one of the most efficient numerical tools to accurately characterize magnetic behavior. However, it remains a challenge what material parameters to use in these simulations, since the smallest building blocks are the finite elements of 5-20 nm in size, much larger than the atomic unit cell. It is proposed to use scale-dependent parameters that represent the corrections by the spin-wave fluctuations for finite element simulations.

(2) Time dependent FORC analysis. The energy barrier distribution of a system can be determined from its FORC diagram. Using this energy barrier distribution, the time dependent hysteresis and switching behavior of the system can be determined. This predictive power can become a useful tool for systems where the FORC diagram has been determined on a 10^{1}-10^{3} sec time scales, but the system¹s magnetic response needs to be predicted on the 10^{-9} sec time scales, such as for magnetic recording materials.