Abstract:

Extending Magnetic Recording Areal Densities into the Tb/in^2 range

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Magnetic recording has been the technology of choice for massive storage of information. The hard disk drive (HDD) industry has recently undergone a major technological transition from longitudinal magnetic recording (LMR) to perpendicular magnetic recording (PMR). However, conventional perpendicular recording can only support a few new product generations before facing insurmountable physical limits as grain size is progressively reduced. In order to support a sustained recording areal density growth, new technological paradigms, such as energy assisted recording and bit patterned media recording are being contemplated and planed. A significant problem recently identified with heat assisted magnetic recording is the expected temporal fluctuations of magnetic anisotropy and their impact on recording noise when the medium is being written at or near its Curie point (Tc). These fluctuations are expected to increase in magnitude and dominate the media noise as the grain size of the media is reduced. In this talk we will briefly discuss the state of the art in magnetic recording, the extendibility of current PMR technology and the nature and merits of new enabling technologies. We will focus our attention on the anisotropy fluctuations near Tc, summarizing preliminary modeling results. Specific to this workshop, we will elicit discussion on experimental measurements of temporally resolved magnetization fluctuations near Tc for FePt media in the presence of externally applied magnetic fields which have not been possible or attempted to date.