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Optimizing Graded Recording Media GERGELY ZIMANYI, UC Davis, DIETER SUESS, Technical University, Vienna, DUK SHIN, UC Davis — A key limitation of recording densities arises from the fact that maintaining high thermal stability requires high anisotropies, whereas writeability requires low anisotropies: yielding contradictory requirements. Recently, Victora and Shen proposed that the recording density of perpendicular media is increased in exchange spring media: a structure with a soft and a hard layer. A decrease in coercivity up to a factor of 4 has been predicted. Very recently Suess considered a tri-layer system, reporting further increase. In the present work, we report optimizing media where the anisotropy is a continuous function of the thickness. We performed extensive finite element simulations and optimized the media performance by minimizing the coercivity, while maintaining a high energy barrier against thermal decay and the squareness of the hysteresis loop. Simple analytic estimates suggest that a quadratic thickness dependence is optimal. We explore the role of anisotropy convexity, a hard capping layer, and the exchange interaction. This graded anisotropy media decouples minimizing the coercivity while maximizing the barrier height, promising efficient new ways to optimizing recording media.

Gergely Zimanyi
UC Davis

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