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Exchange Coupled Composite Media for Heat Assisted Magnetic Recording

Less Jitter

Heat-assisted magnetic recording (HAMR) is considered to be the most promising candidate for future information storage. HAMR uses a heating source to reduce the magnetic coercivity of the material during the write operation. This HAMR disk structure features an exchange coupling composite (ECC) comprised of a coupling layer (ECL) that separates a storage layer and a superparamagnetic write layer. The storage layer has a lower Curie temperature (Tc) and a higher anisotropy than the respective ECL and write layers. The composite structure is optimized to reduce jitter for high density data storage by tuning the exchange coupling between the higher Tc write layer and the storage layer. As a result, this new structure has small jitter (approaching the grain size limit) and good tolerance of noise from Tc variance.

Reduces Curie Temperature Dependence

HAMR information storage technology can be greatly affected by the Tc variance, as writing usually occurs at temperatures around Tc of the media. To control the noise caused by Tc variance and offer lower writing temperature, this new design introduces a superparamagnetic writing layer that decouples the recording process from long term storage. Advantages of this new composite media include a small transition jitter, insensitivity to the Tc variance of the storage layer, tunability and low writing temperature.

BENEFITS AND FEATURES:

- Increased reliability and reduction of media noise in heat-assisted magnetic recording
- Thermal exchange coupled composite storage media
- Exchange coupling layer separates storage layer and write layer
- Tunable: can be optimized to reduce jitter by tuning exchange coupling between write layer and storage layer
- Small jitter (approaching the grain size limit)
- Good tolerance of / insensitivity to noise from Tc variance
- Superparamagnetic write layer with higher Curie temperature
- Low write temperature

APPLICATIONS:

- Magnetic disk drives
- Heat-assisted magnetic recording

Phase of Development - Prototype development

Researchers

Randall Victora, PhD
Professor and Department Head, Electrical and Computer Engineering; Director, Center for Micromagnetics and Information Technologies (MINT)
External Link (ece.umn.edu)

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Engineering & Physical Sciences/Design Specifications
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