

Alternative Solutions for Data Storage Using Magnetic Films Exchange-Coupled Through Non-Magnetic Layer

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Abstract—We describe an alternative solution to encode information in magnetic films that goes beyond the conventional way of digital magnetic recording. In our approach the information is stored via a continuous variable, namely the remanent coupling angle between two magnetic films that are separated by a nonmagnetic spacer layer. Using the technique of nuclear resonant scattering (NRS) [1, 2] we show with good precision, how this coupling angle can be conveniently adjusted with high degree of remanence by shortly applied external magnetic fields. Moreover this effect is explained using a micromagnetic model [3, 4]. Extremely important for future applications of this concept, we demonstrate, that the remanent coupling angles can be read out via magneto-optical or magneto-resistance effects. In principle, this approach allows to design novel memory cells for advance data storage devices, where multiple states per unit cell can be generated and recorded.

Index Terms—Magnetic films, data storage, FePt

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