The perpendicular magnetic recording, the realistic issue to the longitudinal one, offers significant advantages: stronger write and read fields, media of higher anisotropy, smaller grain size, higher signal-to-noise ratio (SNR), and a better thermal stability. Unfortunately, it has still to cope important physical and technological difficulties.

The SNR being proportional to the number of ferromagnetic grains in a bit, the particle size should be of few nanometers. Or such particles are thermally unstable as their size is close to their superparamagnetic limit. The effect is described by the thermal stability factor \( \? = K_u V/(k_B T) \); \( K_u \) is the uniaxial anisotropy constant, \( V \) is the grain volume, \( k_B \) is the Boltzmann’ constant, and \( T \) is the temperature. This factor synthesizes the famous \textit{tri-lemma} of magnetic recording: To obtain a high recording density the volume \( V \) must be reduced, but in order to increase the thermal stability, one should increase \( K_u \) as much as the magnetic field of the write head permits, because high \( K_u \) granular media lead to huge writability difficulties. The writability problem can be solved using various assisting reversal methods.

Another reason that impedes a complete valorisation of the potential of the perpendicular recording is the jitter noise, due to the intergranular exchange coupling. It can be reduced with the help of dense pinning sites, but an optimal value of the intergranular exchange coupling must be found following from the trade-off between SNR and thermal stability.

All these problems can be overcome by adopting new media structures and many ingenious solutions were proposed. In this paper the coupled granular/continuous (CGC) media, a subtle association of the continuous and, respectively, granular media, are analysed from the viewpoint of their magnetic and recording properties. The challenges and possible improvements of CGC media are discussed.

\textbf{Keywords:} coupled granular/continuous media, areal recording density, thermal stability

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