

# Challenges in Magnetic Recording Media

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## Abstract

The conventional magnetic recording approached the physical frontiers of the recording density. The magnetic recording must face a famous trilemma: In order to increase the recording density, smaller grain volumes are needed, but in order to ensure the thermal stability of recorded information, the anisotropy should be increased accordingly; which requires higher writing fields that are unavailable with the magnetic materials of the current heads. Perpendicular magnetic recording has made huge progress, resulting in high-density disk drive products, but still remain important factors limiting its performance, as the superparamagnetic effect and the jitters that lower the SNR. The anisotropy of the granular media, the saturation induction of existing materials, and the geometry of the magnetoresistive heads are the main factors that determine the jitter configuration. With the current values of these parameters, the conventional perpendicular recording (CPR) is limited to a density of about 1 Tb/in<sup>2</sup>. The writability problem can be solved using various assisting methods: domain-wall-, heat-, and microwave-assisted reversal methods. To overcome the main drawbacks of CPR, many solutions for the media structures were proposed. This presentation is devoted to a short analysis of the most promising among them: patterned recording media, coupled granular/continuous media, and exchange coupled composite media. Challenges and possible improvements are summarized.

## Biography of Presenting Author



**Horia Gavrilă** is an Emeritus Professor at the Electrical Engineering Department of the University “Politehnica” of Bucharest, Romania. He is the Director of Center of excellence research in higher education MAGNAT, in the field of Applied and Technical Magnetism. He is Co-director of the Advanced Studies Institute NATO. He received his PhD in Theoretical Electrical Engineering in 1972 from Polytechnic Institute of Bucharest. He is the Member of the Academy of Technical Sciences in Romania. He is the Director/responsible of 6 international projects and 26 national research projects and participant to other 50 projects. He received the Award of Romanian Academy (2000) and Award “OPERA OMNIA” of University “Politehnica” of Bucharest (2008), for his research activity. He is Life Senior Member of I.E.E.E., Magnetics Society and vice president of IEEE Magnetics Society Chapter of the Romanian Section.

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