Nanoscale Heat Transfer in the Head-Disk Interface for Heat Assisted Magnetic Recording

Haoyu Wu,1, a) Shaomin Xiong,1,2, b) Sripathi Canchi,2 Erhard Schreck,2 and David Bogy1

1) University of California at Berkeley
2) HGST, a WD company

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Laser heating has been introduced in heat-assisted magnetic recording (HAMR) in order to reduce the magnetic coercivity and enable data writing. However, the heat flow inside a couple of nanometers head-disk gap is still not well understood. An experimental stage was built for studying heat transfer in the head-disk interface (HDI) and the heat-induced instability of the HDI. A laser heating system is included to produce a heated spot on the disk at the position of the slider. A floating air bearing slider is implemented in the stage for sensing the temperature change of the slider due to the heat transfer from the disk by the use of an embedded contact sensor (ECS), and the gap between the two surfaces is controlled by the use of a thermal fly-height control (TFC) actuator. By using this system, we explore the dependency of the heat transfer on the gap spacing as well as the disk speed and temperature.

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a)wuhaoyu@berkeley.edu
b)shaomin.xiong@hgst.com, xshaomin@berkeley.edu