



### Superior stability

Recording density grows twice a year to satisfy the demand of large capacity information storage. Minimum grain size of the ferromagnetic thin film reached 7 nano-meter in average. Technically the grains can be smaller, but in longitudinal recording, recorded information gradually disappear because of the thermal effect that weakens neighboring magnets each other. In perpendicular recording even small grains are stable due to the attracting (magnetic-static) interaction.

It looks like an easy idea, but the announcement by Prof. Iwasaki of Tohoku University was the first. "I would like to accomplish not an improvement, but principle innovation. Everybody considered nothing is possible except "horizontal", I concluded based on the history and philosophy of technology.

### Overcome ironical criticism

High density performance of perpendicular was recognized from the early stage. Japanese researchers drove forward. However multiple improvements increased recording density of longitudinal recording. There were ironic comments such as "most important contribution of perpendicular recording is the acceleration of horizontal recording technology."

Commercialization of perpendicular recording will be initiated by Toshiba, who have already announced by the end of June, 2005. Hitachi global storage technology is planning to ship the perpendicular by the end of this year, 2005. Seagate technology, USA, "If the market requests, we can launch perpendicular products within this year".