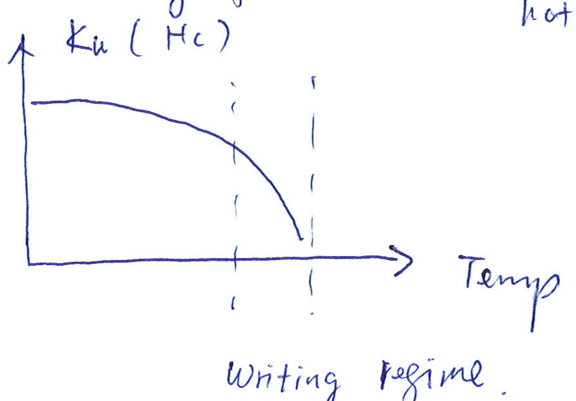
1. Thermal stability factor $= \frac{K_u V}{k_B T}$

$\frac{K_u V}{k_B T} = 60$; $V = \frac{4}{3}\pi \times (3\times10^{-7})\ cm^3$; $T = 300\ K$

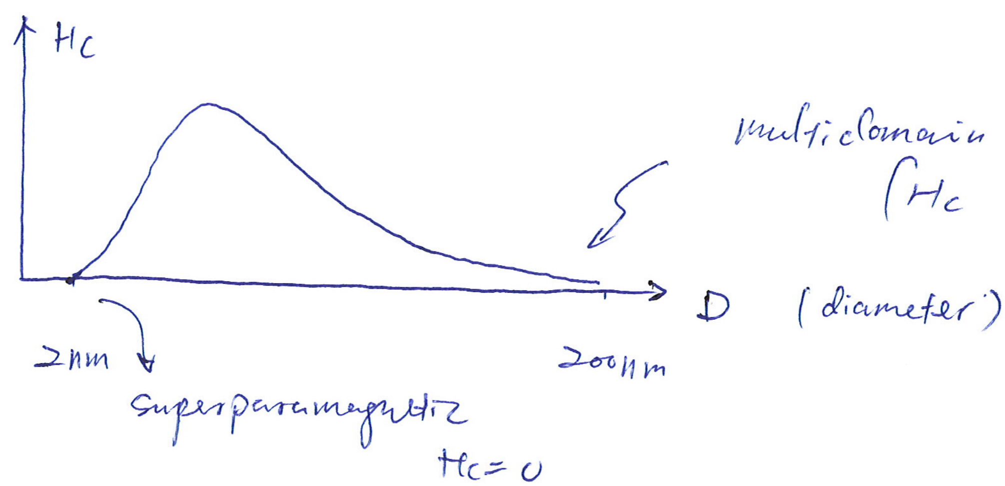
$K_u = 2.2 \times 10^7\ erg/cm^3$

potential candidates : $L1_0$ FePt , $SmCo_5$, $Sm_2Fe_{17}N_3$, $[Co/Pt/Pd]_n$.

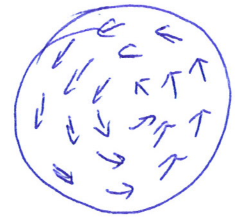
2. Locally heating the recording grains to lower the switching field. The temperature is close to but not necessary equal to Curie temp.



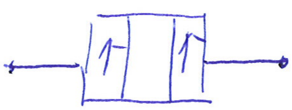
3.



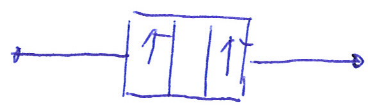
4. low k leads to lower magnetocrystalline anisotropy. Thin disk leads to dominated magnetostatic energy, which competes with the exchange coupling energy to form a vortex structure



5.



parallel

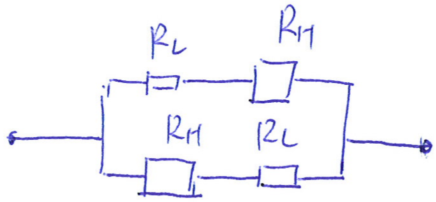


anti-parallel

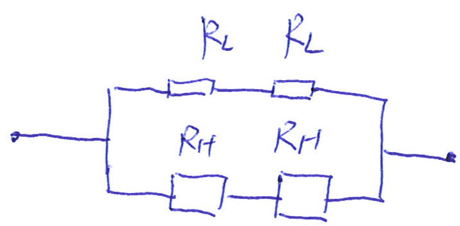
spin ↑ R_L: assume spin direction is same as local moment

spin ↓ R_H: " " opposite "

two-channel model:



(P)



(AP)

$$R_P = 2R_L // 2R_H$$

$$R_{AP} = (R_L + R_H) // (R_H + R_L)$$

$$R_{AP} - R_P = \frac{(R_H - R_L)^2}{2(R_H + R_L)} > 0$$

6. To use a magnetic soft material (e.g. FeNi, FeCo) to exchange couple to the magnetic hard material. the switching of the magnetic soft layer helps the switching of the magnetic hard layer. The exchange coupling between two layers should be properly controlled, otherwise this idea won't work.