

Molecular layers and electric fields as tools for controlling magnetism in nanostructured systems

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✦ Light-sensitized magnetic devices

Diluted magnetic semiconductors-GaMnAs

Dye-molecule functionalization

Light-exposure effect on magneto-transport properties

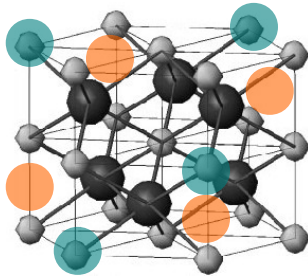
✦ Electric-field-effect magnetic devices

FePt-Coercive field distributions

Electric-field effect on magnetotransport properties-dielectric barriersc

Diluted magnetic semiconductors-GaMnAs

Zinc-blende structure



Interstitial Mn



Substitutional Mn

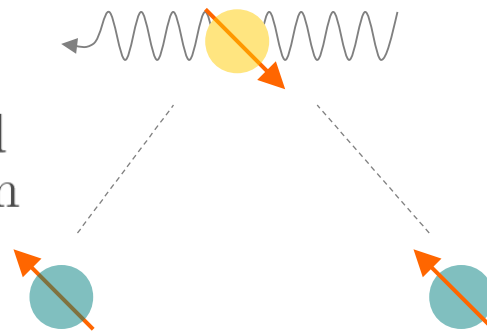


Magnetic moment

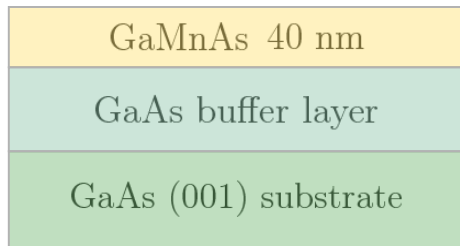


Holes

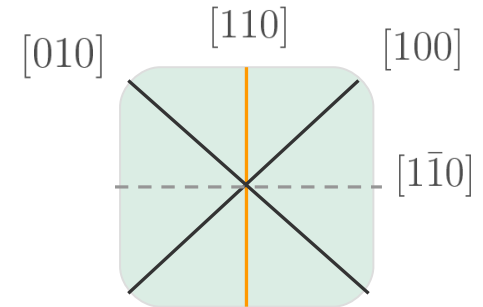
Hole mediated
ferromagnetism



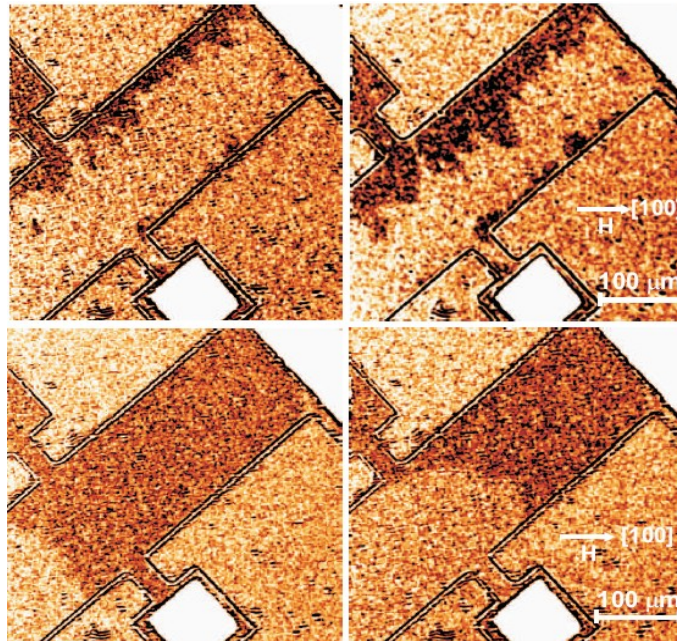
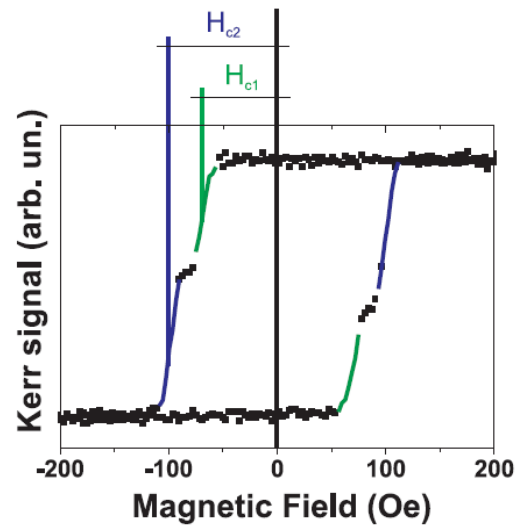
Diluted magnetic semiconductors-GaMnAs



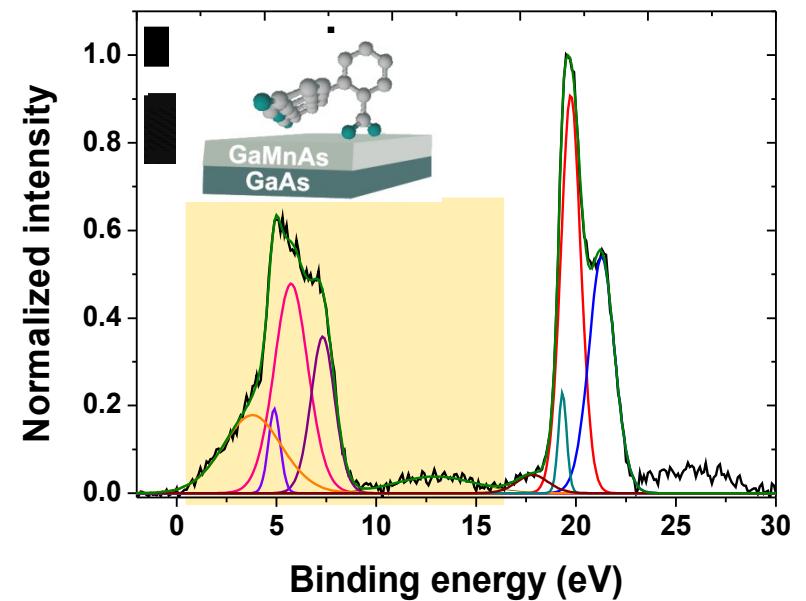
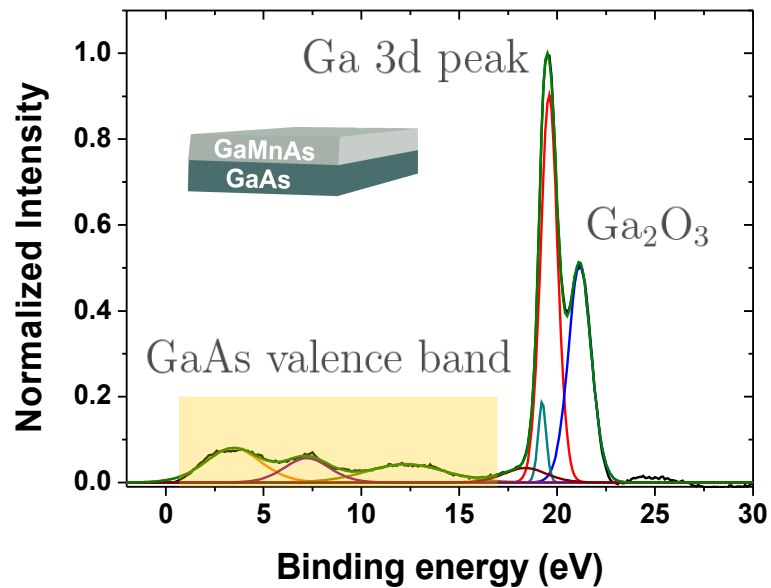
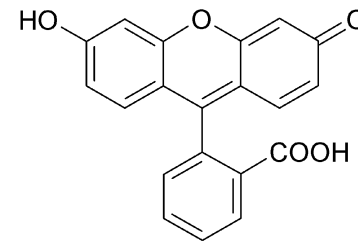
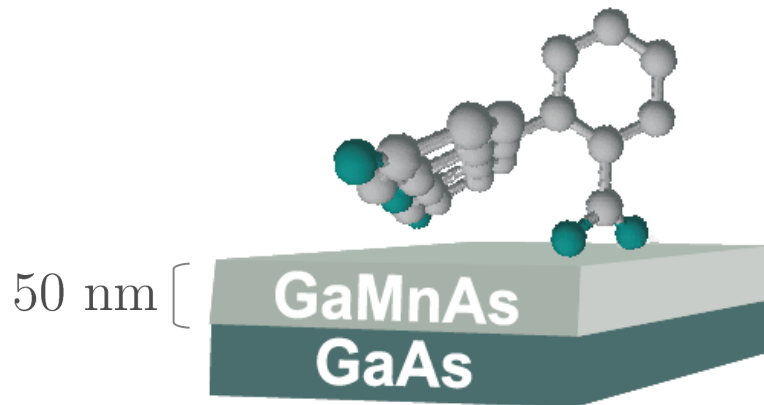
magnetization
in-plane



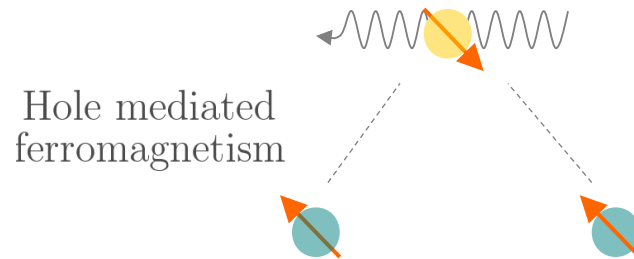
uniaxial+biaxial anisotropy



Dye-molecule functionalization

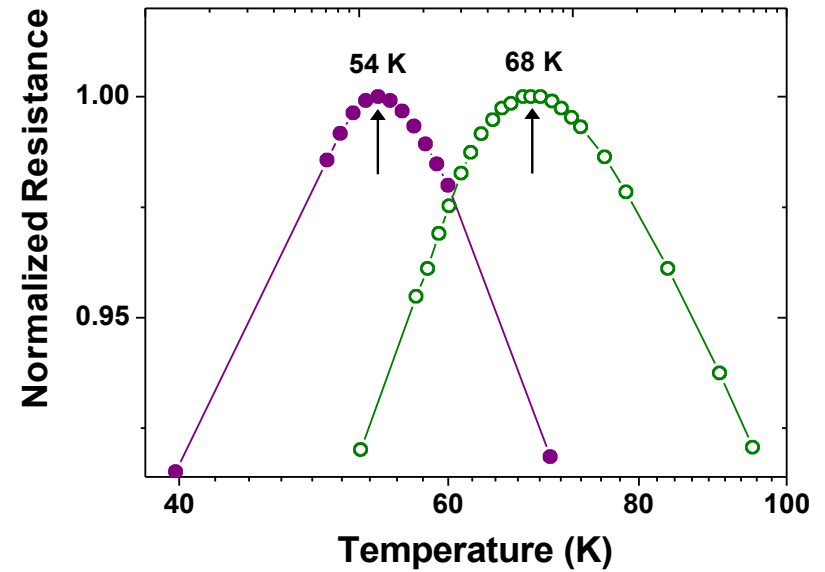
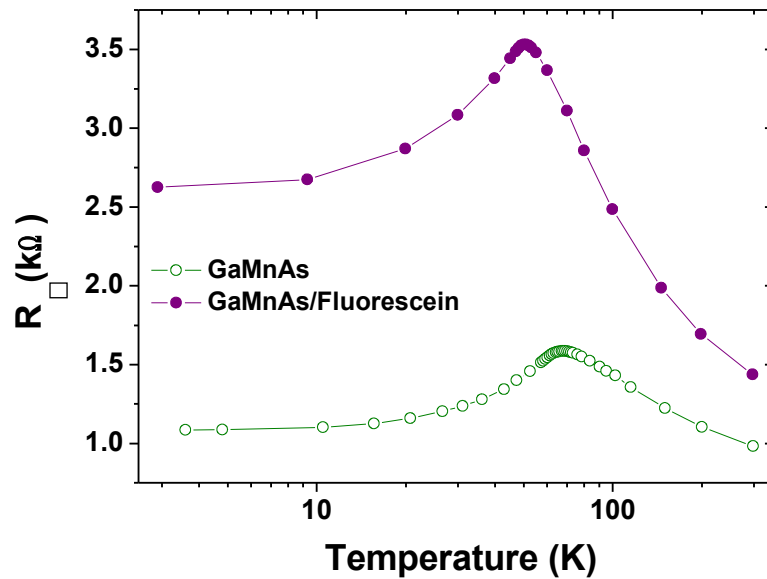


Dye-molecule functionalization



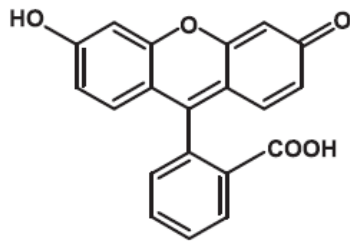
$$T_c \propto p^{1/3}$$

p : charge carrier concentration

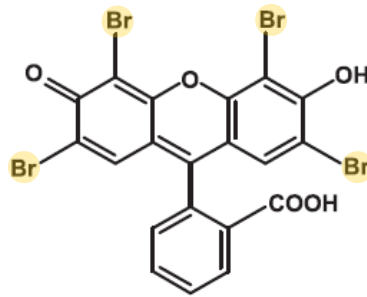


Dye-molecule functionalization

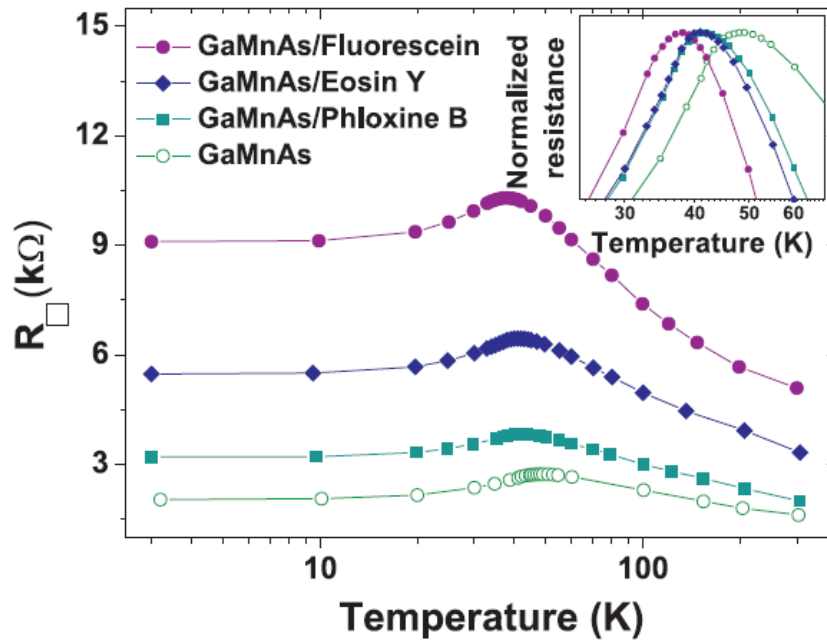
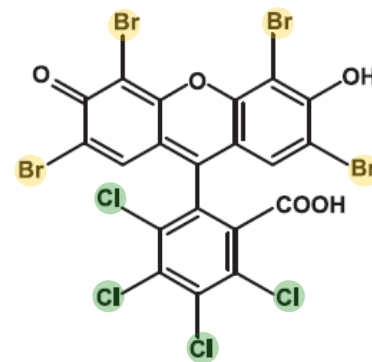
Fluorescein



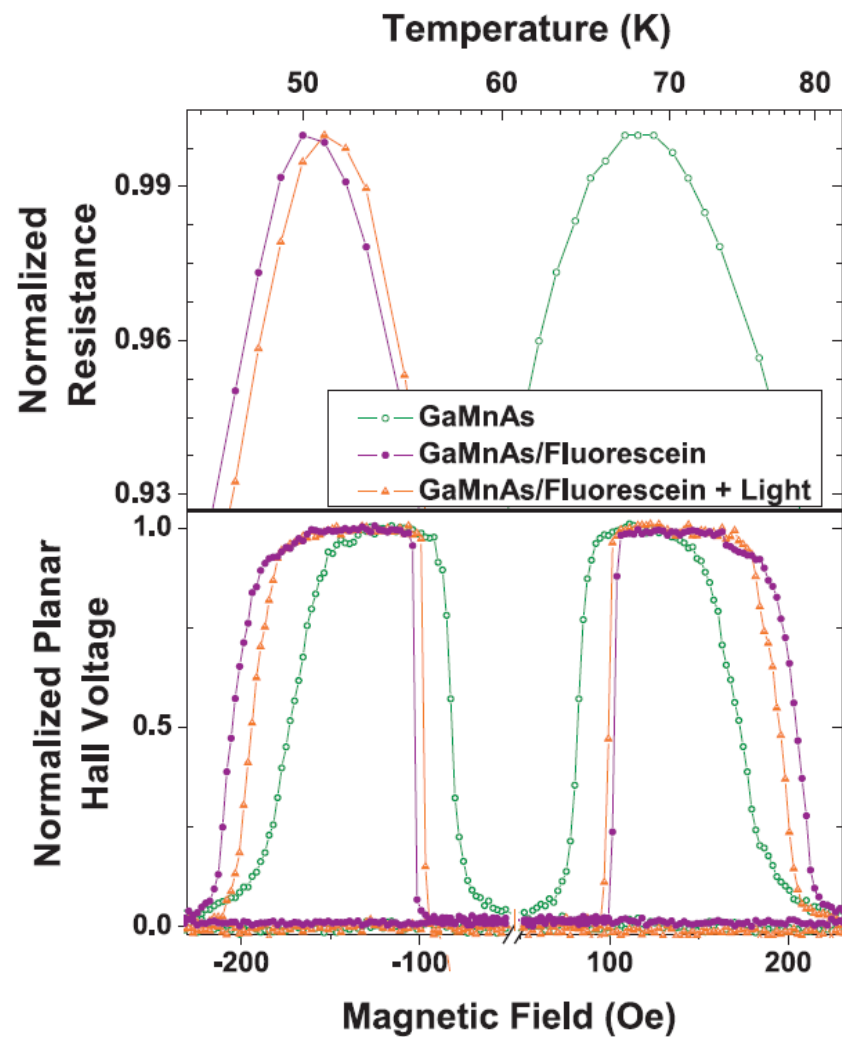
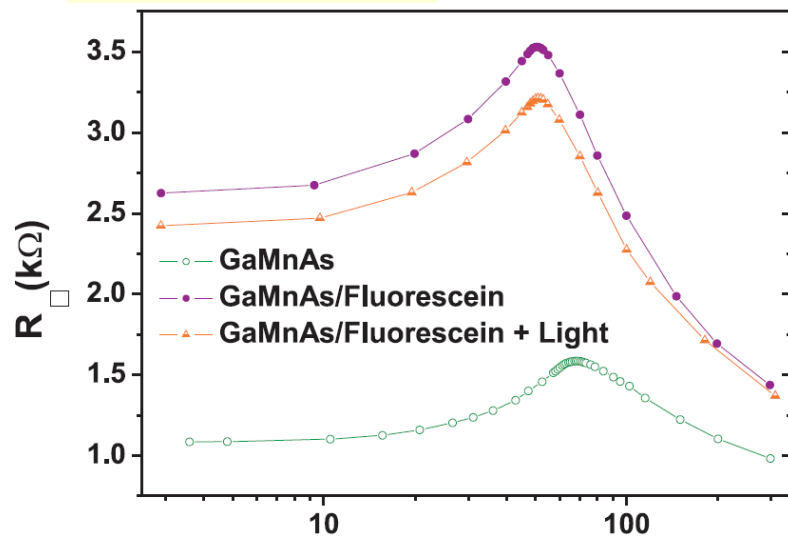
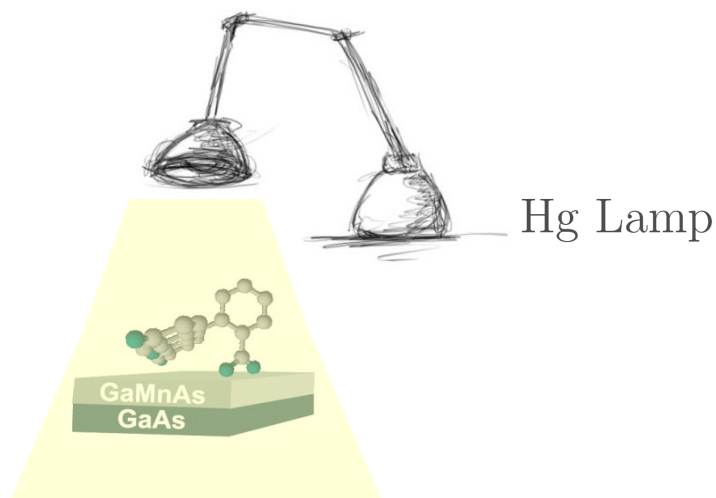
Eosin Y



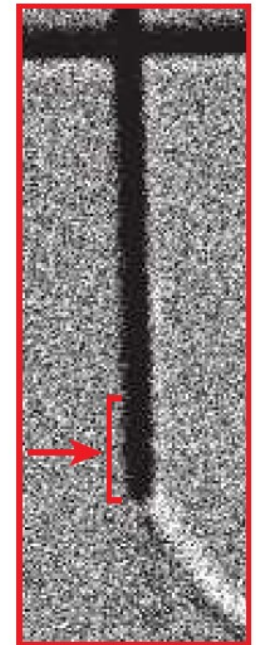
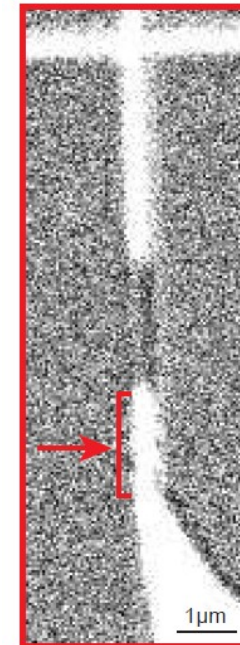
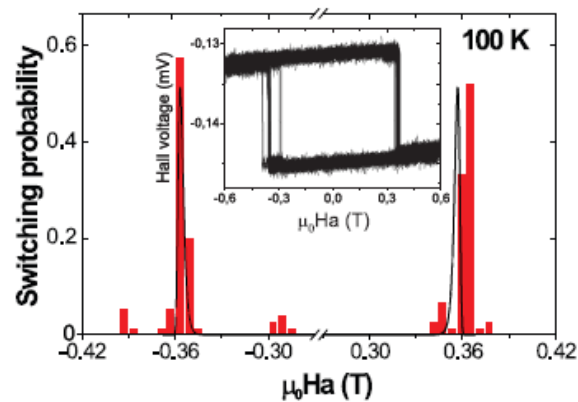
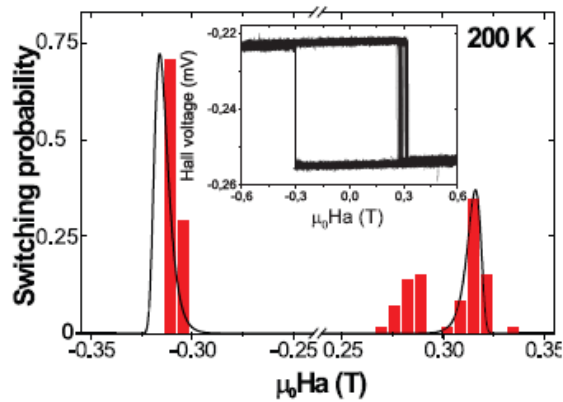
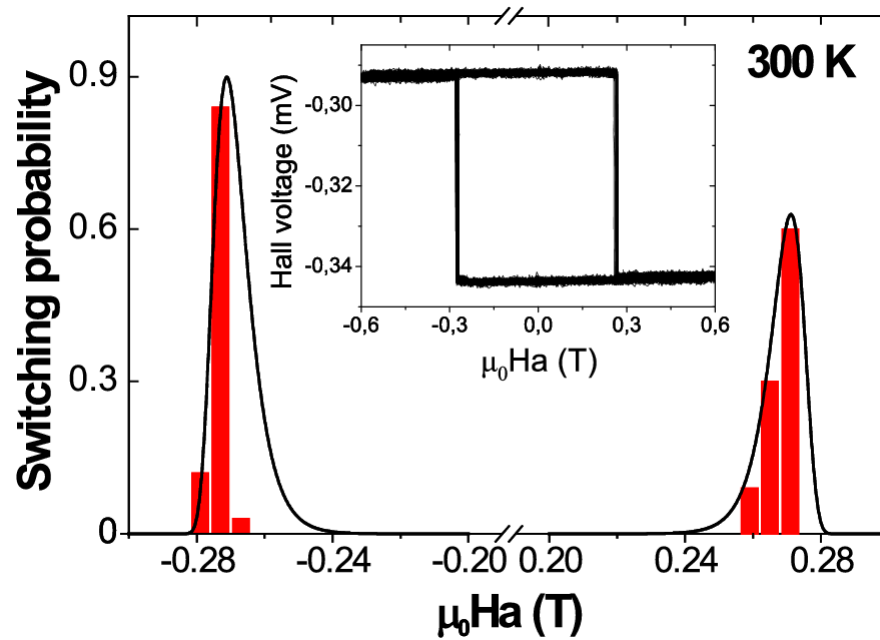
Phloxine B



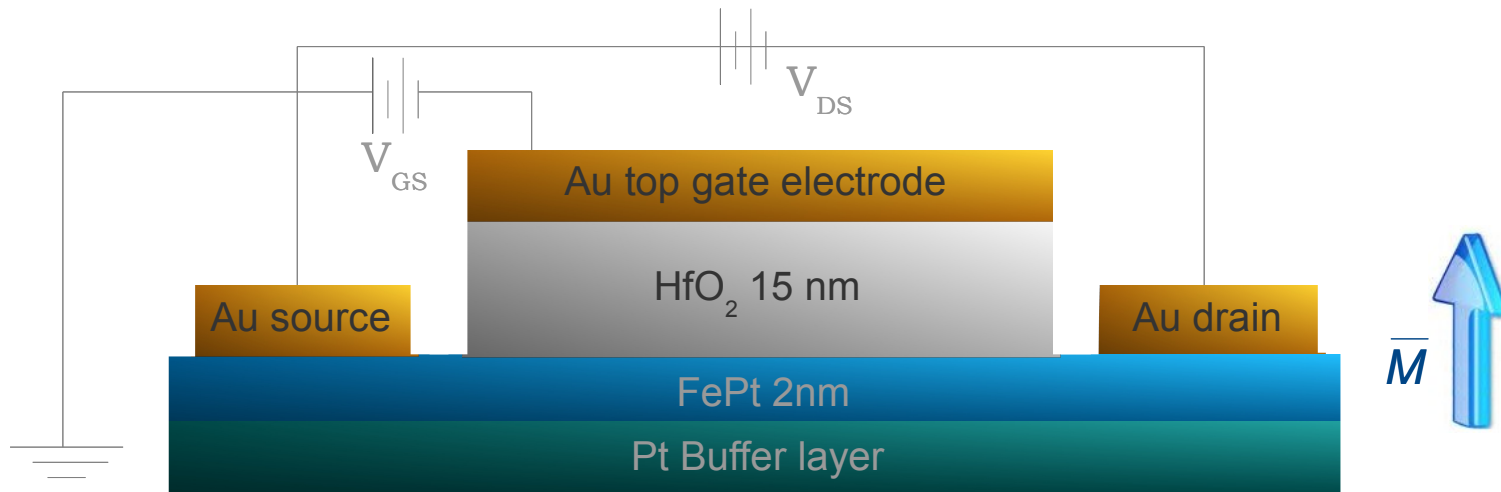
Light-exposure effect on magnetotransport-properties



FePt-Coercive field distributions



Electric-field effect on magnetotransport properties-dielectric barriers





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References:

- L. Herrera Diez *et al.* Applied Physics Letters **98**, 022503 (2011).
L. Herrera Diez *et al.* Physical Review B **78**, 155310 (2008).

Thank you