

PIC 2 Workshop - Pitch



Microssistemas e Nanotecnologias



MEFT

Boosting the Future

Magnetic sensors with superior performance: material and design optimization for angular sensing

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Motivation: Why do we need precision?

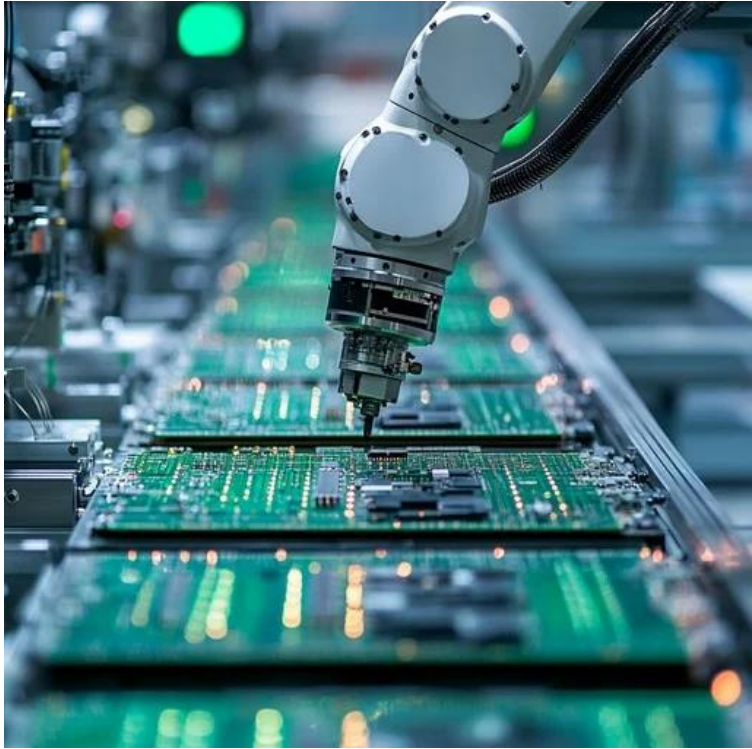


MISTAKES = 



Surgical robot “da Vinci Xi” from INTUITIVE

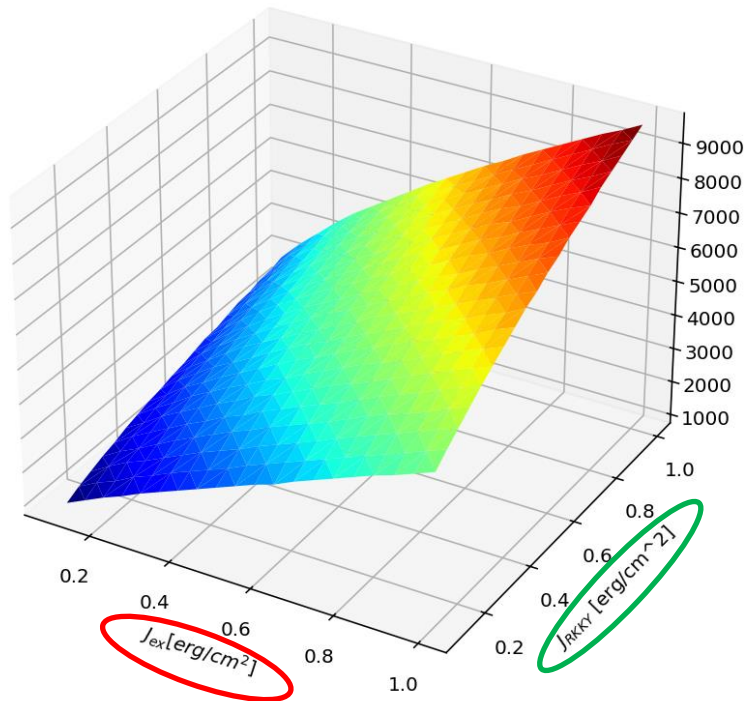
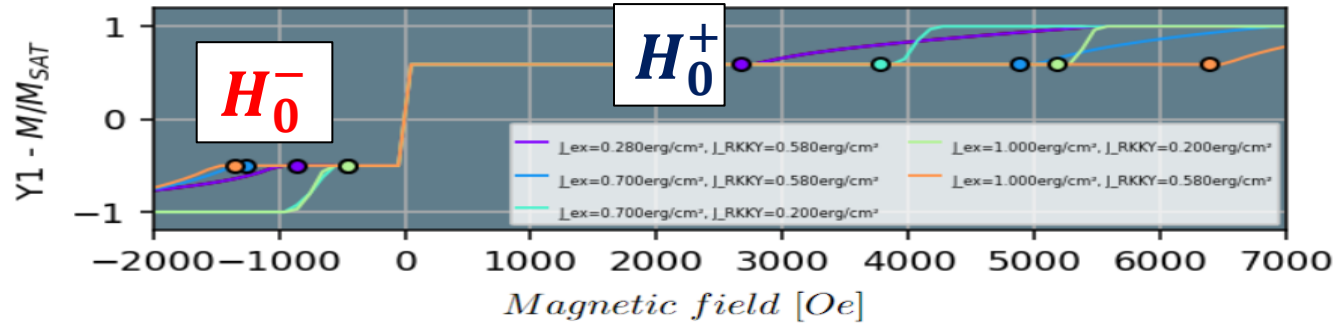
INTUITIVE



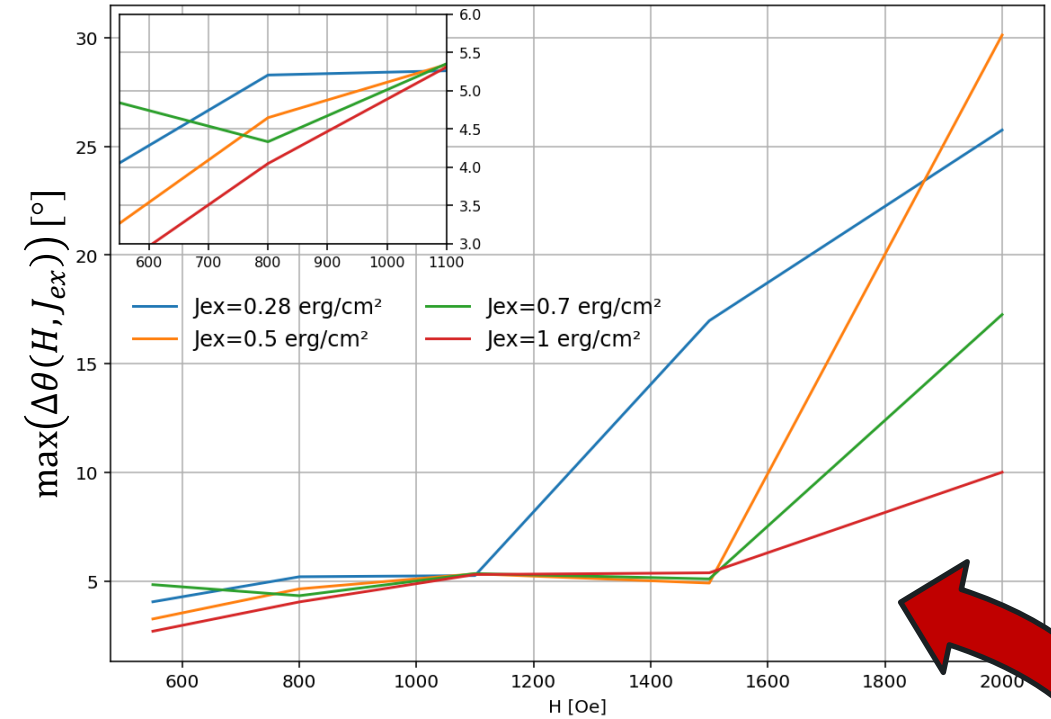
Microchip Assemblers robots

<https://www.sweetwaternow.com/doctor-shares-experience-with-new-da-vinci-surgical-robot/>

Addressing the challenge: Material and Design

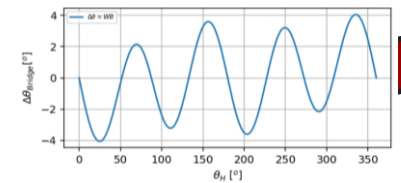


$$\Delta H_0 = H_0^+ - H_0^-$$

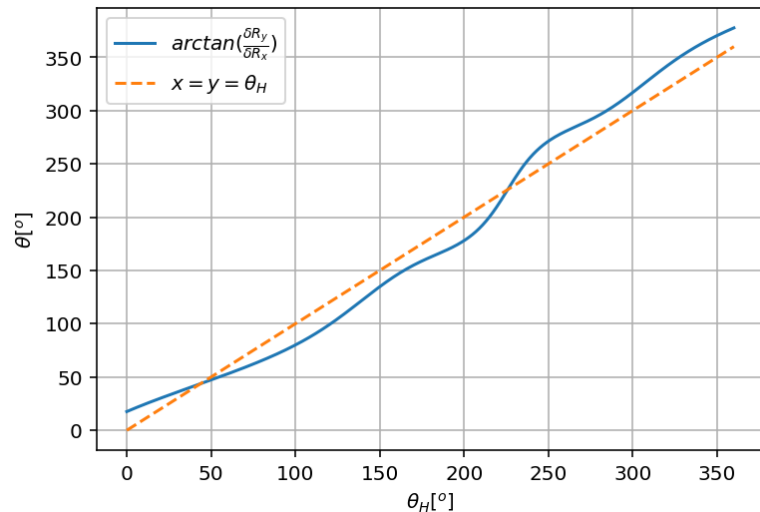
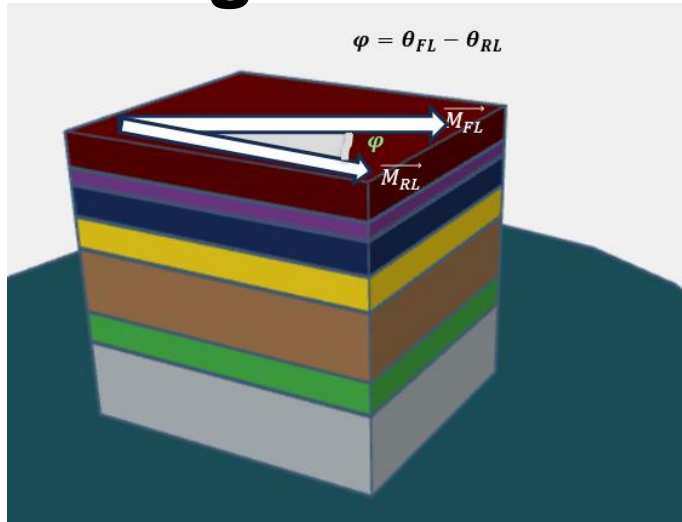


• J_{ex} and J_{RKKY} :

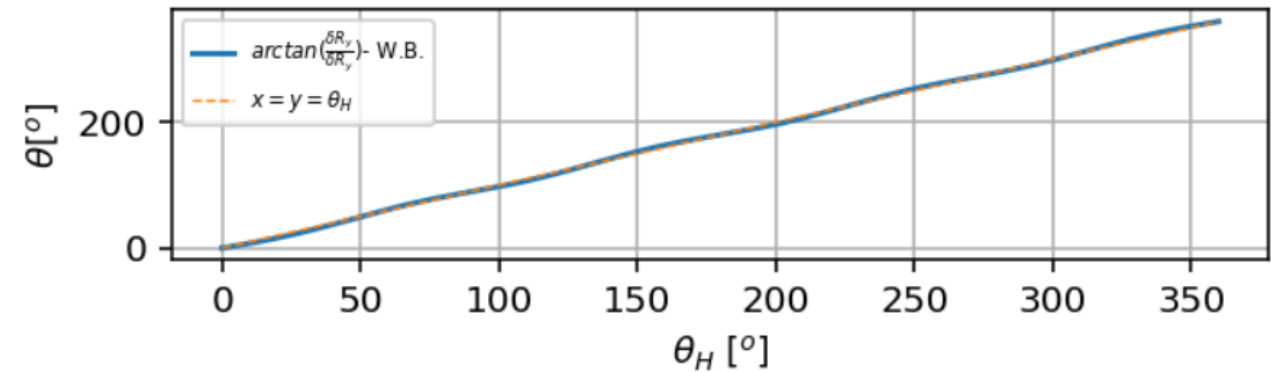
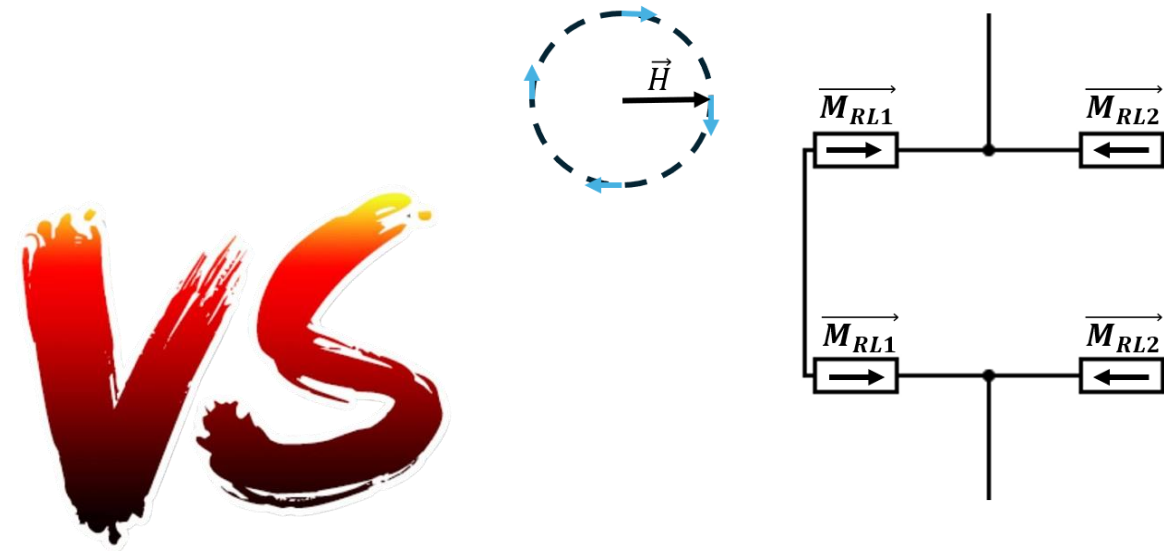
related to materials and design properties, and they strongly relate to sensor precision!



Single Sensor



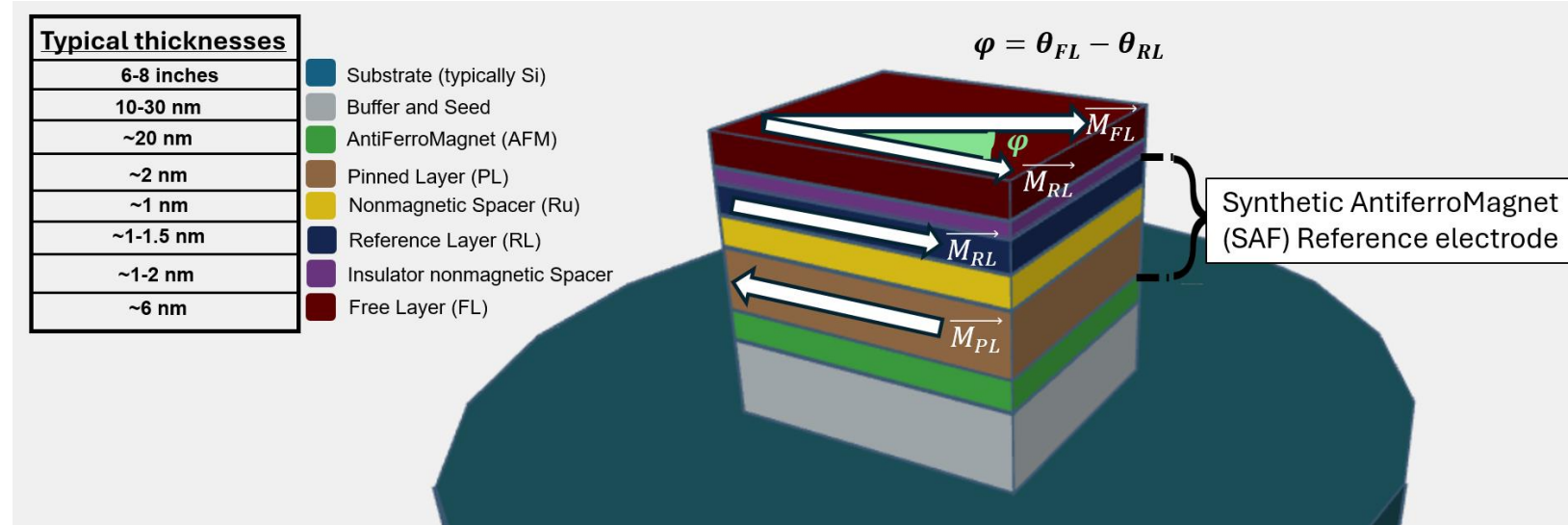
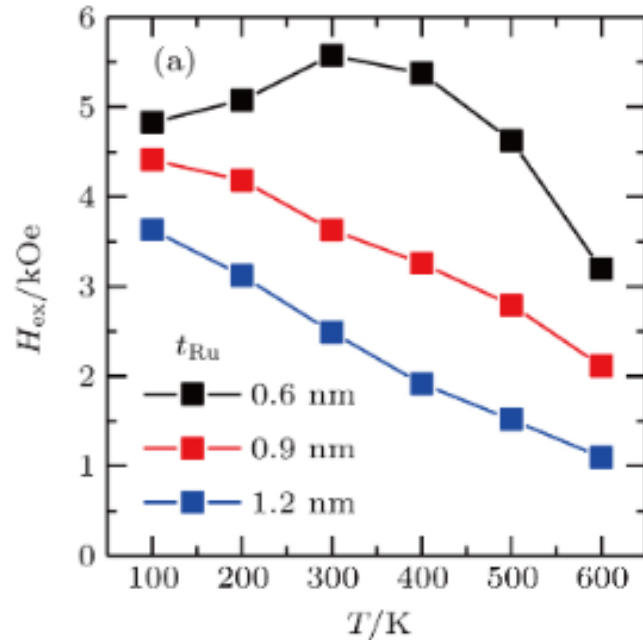
Weathstone bridge setup



Next Steps in Precision Sensing



Li Yong, Jin Xiangjun, Pan Pengfei, Tan Fu Nan, Lew Wen Siang, Ma Fusheng. Temperature-dependent interlayer exchange coupling strength in synthetic antiferromagnetic [Pt/Co]₂/Ru/[Co/Pt]₄ multilayers. *Chinese Physics B*, 2018, 27(12): 127502



- J_{ex} : higher temperatures **reduce plateau range** e the **stability of the exchange coupling!**
- Explore further the usage of other materials for all the many layers;
- Include geometry dependance!



SPECIAL THANKS TO PROFESSORS SUSANA FREITAS, PAULO FREITAS AND
ALL INESC-MN COLLEGUES.

THANK YOU FOR YOUR ATTENTION!

