Photonics of *in situ* twisted 2D materials

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Twisting two thin flakes of van der Waals material generates rich emerging physics of moiré excitons, Hubbard model simulators, tuneable polaritons, etc. Recent work [1] demonstrated that it's possible to change the angle between flakes *in situ*, allowing to measure in a single device all twist configurations. Here we expanded this concept to a setup that has the optical access and operates at cryogenic temperatures (Fig. 1, left). The materials under study is CrSBr, a novel 2D antiferromagnet that hosts strongly coupled exciton-polaritons [2]. The strong anisotropy of the dielectric tensor of CrSBr allows great tunability of polaritonic absorption and emission spectrum of the stack. We present the first measurements of this system (Fig. 1, right), where we tune polaritonic resonance by 20 meV by controlling the twisting angle between two CrSBr slabs over 70 degrees with a 2 degree resolution.

References

[1] Inbar, A., Birkbeck, J., Xiao, J. et al., Nature, 614 (2023) 682–687
[2] Wang, T., Zhang, D., Yang, S. et al., Nat Commun, 14 (2023) 5966

Figures

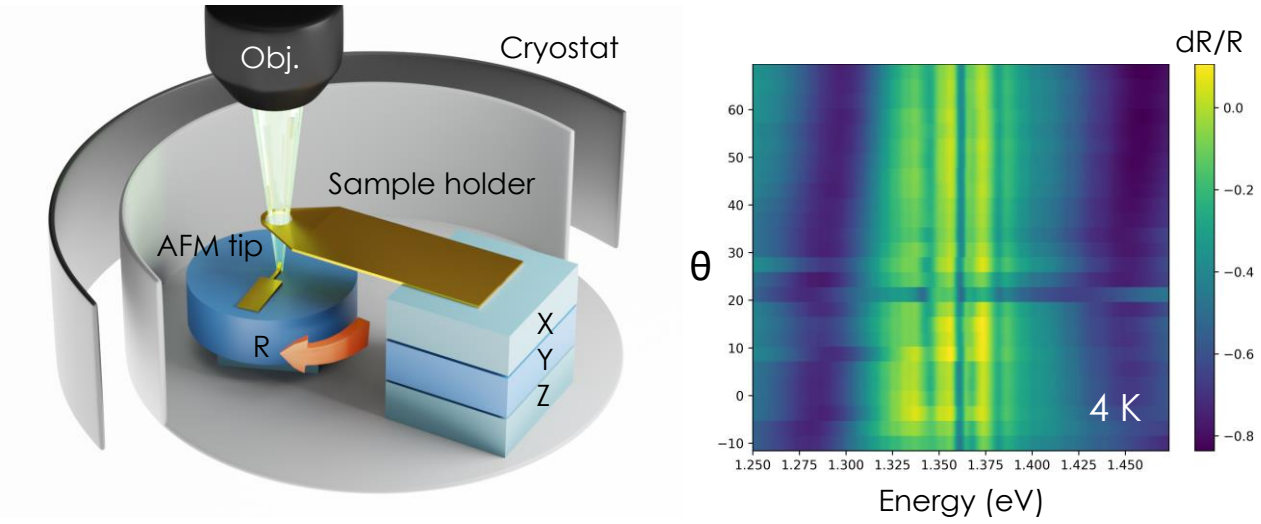

Figure 1: (left) A realized setup for *in situ* twist angle dependent optical measurements. (right) A twist angle dependence of the polaritonic spectrum of two CrSBr slabs.