Controlled moiré potentials of $MoSe_2/WSe_2$ for time resolved two color pump probe measurements

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Control of the twist angle in heterostructure remains challenging as the crystal orientation is not evident a priori. Chemical vapor deposition can yield TMDC monolayer in a triangular shape, which is directly locked to the crystallographic orientation [1].
We successfully encapsulate CVD-WSe_2 with the hot pickup method [2]. We perform time resolved reflectivity (monoexponential fit: decay constant t=10ps) and Kerr-ellipticity (biexponentials fit: decay constants t_1=0.25 ps; t_2=4ps).
We also built $MoSe_2/WSe_2$ heterostructures with different stacking angle. Here we can probe the interlayerexciton by pumping the exciton in $MoSe_2$ and probing resonances in WSe_2. The first time resolved Kerr-ellipticity measurements yield quite different decay times.

References

[1] I. Paradisanos, Nature Communications 11 (2021)
[2] D. G. Purdie et al. *Nat Commun* **9**, 5387 (2018)

Figures

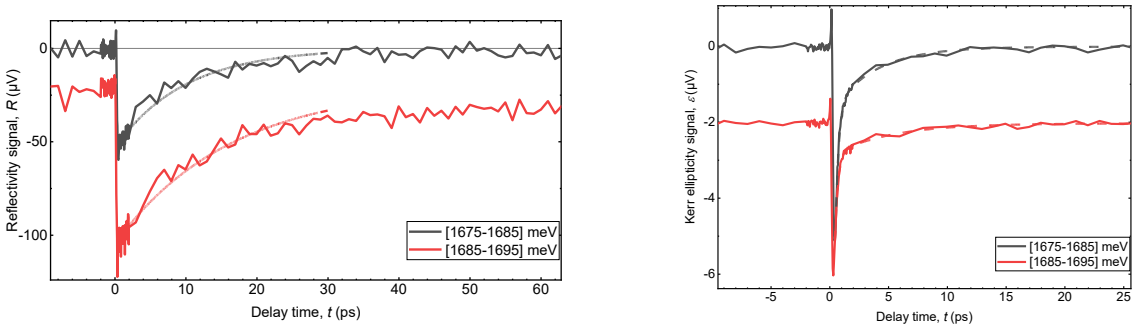

Figure 1: Time resolved reflectivity and Kerr-ellipticity of encapsulated CVD WSe_2

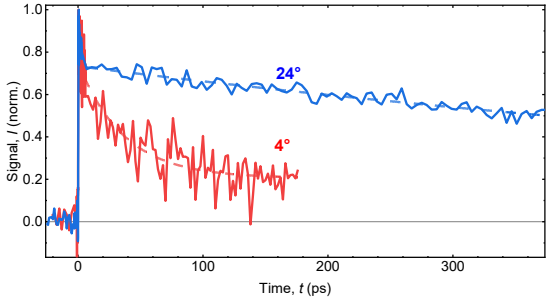

Figure 2: Kerr-ellipticity signal of $MoSe_2/WSe_2$ heterostructure with different staking angles