Title: **Symmetry breaking and Chern insulators in twisted graphene structures**

Twisted bilayer graphene (tBG) and variants like twisted monolayer-bilayer graphene (tMBG) were proposed to be a platform for strongly correlated physics akin to the cuprate family. However, I will show that many of the observed interacting phenomena can be explained in terms of breaking of spin/valley symmetry.

To do so, I will first describe how flat bands in tBG can be directly observed using ARPES [1]. An effective description of the flat bands is hampered by band renormalization due to charge transfer [2] and band topology.

The combination of interactions and topology naturally leads to spin/valley symmetry breaking with a quantum anomalous Hall effect in tMBG [3]. In tBG in large magnetic fields, similar spin/valley symmetry breaking creates a series of Chern insulator states [4].

I will conclude with a brief discussion of the possibility of genuine strong correlations in Moiré structures.

References:

[1] Lisi et al., Nature Physics, 556, 80 (2020)
[2] Rademaker, Abanin, Mellado, Phys. Rev. B, 100, 205114 (2019)
[3] Rademaker, Protopopov, Abanin, Phys. Rev. Research, 2, 033150 (2020)
[4] Saito, Ge, Rademaker, Watanabe, Taniguchi, Abanin, Young, Nature Physics, 108, 12233 (2021)