

**Speaker: Laura CLASSEN (Max Planck Institute)**

### **Topological superconductivity in moiré transition metal dichalcogenides**

Homo- or hetero-stacks of transition metal dichalcogenides (TMDs) have enriched the opportunities for analysis and utilization of correlations in moiré systems. Theoretical predictions and experimental observations confirm the relevance of many-body interactions in these systems, and demonstrated the importance of their extended range. Since the interaction, its range, and the filling can be tuned experimentally by twist angle, substrate engineering and gating, we explore Fermi surface instabilities and resulting phases of matter of moiré bilayer TMDs. They are describable by extended triangular-lattice Hubbard models, which we study via an unbiased renormalization group approach. We establish in particular that hetero-bilayer TMDs are unique platforms to realize topological superconductivity with winding number  $|N| = 4$ . We show that this state reflects in pronounced experimental signatures, such as distinct quantum Hall features.