**Speaker:** Alex Wietek

**Title:** Mott insulating states with competing orders in the triangular lattice Hubbard model

**Abstract:**

The physics of the triangular lattice Hubbard model exhibits a rich phenomenology, ranging from a metal-insulator transition, intriguing thermodynamic behavior, and a putative spin liquid phase at intermediate coupling, ultimately becoming a magnetic insulator at strong coupling. We combine a finite-temperature tensor network method, minimally entangled thermal typical states (METTS), with two Green function-based methods, connected-determinant diagrammatic Monte Carlo (DiagMC) and cellular dynamical mean-field theory (CDMFT), to establish several aspects of this model. We elucidate the evolution from the metallic to the insulating regime from the complementary perspectives brought by these different methods. We compute the full thermodynamics of the model on a width-4 cylinder using METTS in the intermediate to strong coupling regime. We find that the insulating state hosts a large entropy at intermediate temperatures, which increases with the strength of the coupling. Correspondingly, and consistently with a thermodynamic Maxwell relation, the double occupancy has a minimum as a function of temperature which is the manifestation of the Pomeranchuk effect of increased localisation upon heating. The intermediate coupling regime is found to exhibit both pronounced chiral as well as stripy antiferromagnetic spin correlations. We propose a scenario in which time-reversal symmetry broken states compete with nematic, lattice rotational symmetry breaking orders at lowest temperatures.