

Tuesday, April 30th @ 2pm  
Schwinger Lounge

# “Keeping matter in the loop in 3d quantum gravity”

**Jackson Fliss (Cambridge)**

**Abstract:** Chern-Simons theory provides an attractive, intrinsically diffeomorphism invariant, framework for 3d quantum gravity. In this talk, I will describe a new method for incorporating matter into CS gravity while retaining its useful features. The key object is the "Wilson spool," a gauge-invariant, effective description of massive one-loop determinants. I will illustrate its utility for reproducing the physics of massive scalar and spinning fields in both Anti-de Sitter and de Sitter backgrounds. Time permitting, I will further discuss how, in the context of de Sitter quantum gravity, exact results in Chern-Simons theory allow one to calculate finite  $G_N$  corrections to the spool. This is based on [2302.12281], [2304.02668], and upcoming work.