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Monte-Carlo Study of Phase Transitions out of Symmetry-Enriched Topological phases of bosons in Two-dimensions[1] JONG YEON LEE, OLEXEI MOTRUNICH, SCOTT GERAEDTS, Cal Inst of Tech (Caltech) — In this work, we studied a statistical mechanics model of two species of bosons with mutual statistics $\theta = 2\pi/n$ in (2+1) dimensions. This is a model for quasi-particles in a symmetry-enriched topological quantum phase of bosons with charge fractionalization, and by studying condensation of the quasi-particles we can access nearby phases. Through a reformulation, sign problem was eliminated and we could perform Monte Carlo simulation of this model. We focused on the phase transition point between the topological insulator and trivial Mott insulator to study critical properties of the transition. By measuring correlations in terms of original variables and dual variables, with finite size scaling, we could narrow down the region of criticality, and concluded it is a continuous multi-critical point. We extracted critical exponents for the topological phase transition.

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