Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **428** Type: **Invited Speaker / Conférencier(ère) invité(e)**

A New Kind of Symmetry: Rethinking Anomalies in Quantum Systems

Monday 9 June 2025 10:45 (30 minutes)

Anomalous symmetries play a central role in modern physics, from quantum field theories (QFTs) in the infrared to lattice models in the ultraviolet. Typically, anomalous symmetries are characterized by their appearance on the boundary of symmetry-protected topological (SPT) phases. However, folklore has also treated several other phenomena—such as the obstruction to a single symmetric, gapped, non-degenerate ground state, the inability to gauge the symmetry, and non-onsite realizations—as interchangeable signatures of anomaly. In this talk, I will present a new class of symmetry that disproves these longstanding misconceptions. While our symmetry is not anomalous, it cannot be onsite, cannot be gauged, and nonetheless allows a unique, gapped, and symmetric ground state—demonstrating that these criteria are not equivalent. Our results clarify the relationships between non-onsiteness and non-gaugeability. I will also describe our classification of the obstructions to onsiteness and discuss implications for both quantum many-body systems and field theory.

Presenter: JI, Wenjie (McMaster University/Perimeter Institute)

Session Classification: (DCMMP) M1-4 Quantum and Topological Matter | Matière quantique et topologique (DPMCM)