

# Computational Research in Boston and Beyond Seminar

## Using $E(3)$ -Equivariant Neural Networks (ENNs) to Uncover Symmetry-Implied Missing Information

Friday, March 7, 2025

12:00 PM - 1:00 PM

Zoom: <https://mit.zoom.us/j/91933017072>



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### Abstract

We demonstrate how  $E(3)$ -Equivariant Neural Networks (ENNs) can detect symmetry breaking in physical data and reveal hidden symmetry-implied information. Symmetry breaking, whether spontaneous (as in crystalline phase transitions) or induced by external forces, plays a crucial role in our understanding of physical systems. We show that an external input parameter to a fully equivariant model can be used to break symmetry in a physically interpretable way. We apply our approach to altermagnets, a new class of magnetic materials, in order to learn magnetic multipoles.