



Department of Materials Science and Engineering,

PhD Candidacy

August 23rd, 2022 at 1:00pm (EDT)

Hill Seminar Room, LeBow 240

Zoom: <https://drexel.zoom.us/j/83287627618>

Chiral skyrmions and Weyl nodes in B20-ordered binary compounds

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Abstract

Structure-property relationships are at the core of materials research. Chirality is relatively rare among structural features in inorganic materials, but can have attractive consequences for functional properties with potential applications in spintronic or optical devices. In this talk, I will focus on an emerging class of binary intermetallic materials that crystallize in the noncentrosymmetric B20 structure resulting in interesting electronic and magnetic phenomena. One striking example is the presence of magnetic skyrmions in B20 compounds such as FeGe and MnSi. Skyrmions are nanometer-scale topological spin textures formed by spin-orbit coupling-induced Dzyaloshinskii-Moriya interaction. More recently, it was discovered that the chirality of B20 materials leads to unanticipated topological features within their band structures. As demonstrated in RhSi, multifold Weyl nodes are present due to a nontrivial Chern number, or topological charge, that is larger than ± 1 . At the conclusion of my talk, I will discuss ongoing questions and future directions in the study of these materials.