

PHYSICS
ART AND SCIENCES

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

FOR APPLICATION YEAR: 2021

PROJECT TITLE: Electronic spectrum of channel Skyrmions in a Kondo insulator

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Project Description

In this project we study the interior of defects in the channel orientation of a channel magnet. These channel-magnets appear as the low-energy phases of certain solid-state systems, called two-channel Kondo lattices. Due to coupling to conduction electrons, these defects can act as trapping potentials that are able to trap electrons. In this project we want to compute the electronic spectrum of a ``skyrmion'' defect using a combination of numerical and analytical approaches. The problem can be reduced to some versions of a particle-in-a-box solution of the Schrodinger equation. The channel skyrmions are expected to realize fractionalized qubits, with potential applications in realizing topologically protected qubits for quantum computation.