

NCMN**EQUATE**
Emergent Quantum Materials and Technologies

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Optimizing and Searching Materials for Li-ion Batteries

ABSTRACT

Li-ion battery technology is still optimizing existing materials and searching for new materials to deliver energy and power for a variety of applications. I will discuss our efforts to optimize LiFePO₄, a well-known and already commercialized cathode, using first-principles density functional theory informed by machine learning and molecular dynamics, as well as our recent experimental and theoretical work on using well-known FINEMET-type amorphous metals as battery materials. These materials are easy to mass-produce, exhibit good ionic and electronic conductivity, and can be used in batteries without current collectors.

BIO

Tula R. Paudel, an Assistant Professor of Physics at South Dakota School of Mines and Technology since 2020, previously worked at the University of Nebraska-Lincoln, first as a postdoctoral fellow and later as a Research Assistant Professor. He has published nearly 100 peer-reviewed papers in the field of energy storage materials, magnetic materials, and quantum materials. He also serves as graduate program coordinator for the Physics department at South Dakota School of Mines and Technology.

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