

Mott transitions in the nickelates

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The perovskite nickelates, RNiO_3 , with $\text{R}=\text{La}, \text{Pr}, \text{Nd}, \dots$, are a canonical set of materials exhibiting Mott metal-insulator transitions.

These materials are currently being studied in thin films, at interfaces, and in heterostructures.

In bulk, the insulating states are known to exhibit intriguing charge and spin ordering structures, which have been rationalized by the influence of strong Hund's rule coupling on the Ni ion.

I will discuss the theory of such charge/spin ordering and how it depends upon the degree of electron localization, and the orthorhombicity of the lattice.

The effects of strain, interfaces, and confinement will also be discussed, using a variety of approaches.