

# Ghost Gutzwiller approach in infinite-layer NdNiO<sub>2</sub>

R. Drachynskyi<sup>1,2</sup> and W. Brzezicki<sup>1</sup>

<sup>1</sup>*Institute of Theoretical Physics, Jagiellonian University,  
Lojasiewicza 11, PL-30348 Kraków, Poland*

<sup>2</sup>*Doctoral School of Exact and Natural Sciences,  
Jagiellonian University, Lojasiewicza 11, PL-30348 Kraków, Poland*

We investigate the electronic structure of infinite-layer nickelates, such as NdNiO<sub>2</sub>, using a ghost Gutzwiller variational approach. The research employs a multi-band Hubbard model to describe the physics of strongly correlated Ni-O planes embedded within a weakly interacting lattice of rare-earth atoms.

By introducing auxiliary ghost orbitals, this framework enlarges the local variational space beyond standard Gutzwiller schemes. This extension allows for a more flexible description of electronic correlations, providing a systematic route to examine the Mott transition, orbital differentiation, and selective renormalization in these materials. The approach aims to bridge effective low-energy descriptions with the complex many-body landscape of superconducting nickelates.