Confinement induced metal-to-insulator transition in (001) and (111) nickelate superlattices

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Intriguing electronic phenomena, that are not available in the parent compounds, emerge by confining transition metal oxides at the nanoscale. In particular the interplay of structural and electronic degrees of freedom in superlattices containing the correlated metal $LaNiO_3$ and the band insulator $LaAlO_3$ will be addressed based on density functional theory calculations including an on-site Coulomb repulsion parameter. Specifically, the role of confinement, strain and crystallographic orientation will be elucidated in the resulting electronic transitions.

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