## First Principles Study of Magnetism and Polarization in 1T-NiI<sub>2</sub> Bilayer

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**Abstract** The transition metal dihalide 1T-NiI<sub>2</sub> has garnered attention due to its distinctive magnetic moment ordering observed both in bulk and monolayer forms. While the bulk material adopts a cycloidal magnetic ground state, recent studies have revealed that in the monolayer, the proper screw helical state represents energetically the most favorable state. In this study, we explore the impact of various helimagnetic configurations of proper screw states in bilayer structures. Leveraging the multiferroic properties of the material, the electric polarization is induced within individual layers and depends on the propagation vector of the helimagnetic waves. The interplay between these proper screw states in bilayers modulates the overall electric polarization, potentially leading to scenarios where it may diminish under specific conditions.

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