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## Resonant Scattering Investigations of Density Wave Ordering in the Bilayer Nickelate $\text{La}_3\text{Ni}_2\text{O}_7$

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The discovery of high-temperature superconductivity in  $\text{La}_3\text{Ni}_2\text{O}_7$  under has motivated the investigation of parent or competing phases which could shed light on the underlying pairing interaction and phase diagram. Here, we employ resonant elastic and inelastic soft x-ray scattering and polarimetry on thin films of bilayer  $\text{La}_3\text{Ni}_2\text{O}_7$  to reveal the existing of a spin density wave (SDW) which forms unidirectional diagonal spin stripes with moments lying within the  $\text{NiO}_2$  plane and perpendicular to the SDW wavevector. These stripes form anisotropic domains with shorter correlation lengths perpendicular versus parallel to the SDW wavevector, revealing nanoscale rotational and translational symmetry breaking analogous to the cuprate and Fe-based superconductors [1]. In addition, we also investigate another polymorph of  $\text{La}_3\text{Ni}_2\text{O}_7$ , a repeating monolayer-trilayer structure (so-called “1313”) and compare the magnetic excitations and ordering between the two polymorphs.

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