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Intermediate Magnetic Phase of Charge-Stripe Ordered $\text{La}_2\text{NiO}_{4.11}$ and the probable trigger for static magnetic ordering.

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In La-based cuprates the low superconducting transition temperature is accompanied with having only a partial gapping of the magnetic excitation spectrum [1]. This allows the magnetic excitations of La-based cuprates to be studied to lower energies than in other cuprate materials [1], and are often compared to those of charge-stripe ordered $\text{La}_{2-x}\text{Sr}_x\text{NiO}_{4+\delta}$ [2,3].

Inelastic neutron studies of La-based cuprates have observed two striking observations at base temperature, a low energy kink in the magnetic excitation spectrum [4], and an offset between the centring of low energy magnetic excitations and the magnetic Bragg peaks[5]. A combined neutron scattering and μSR study of charge-stripe ordered $\text{La}_2\text{NiO}_{4.11}$, shows similar effects as in La-based cuprates[4,5]. In $\text{La}_2\text{NiO}_{4.11}$ there is an offset between the wave vectors of the magnetic Bragg reflections and the low energy magnetic excitations in the ordered phase. Whilst the temperature evolution identifies an intermediate magnetic phase, and determines the probable trigger for static magnetic order in charge-stripe ordered $\text{La}_{2-x}\text{Sr}_x\text{NiO}_{4+\delta}$.

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[3] H. Yoshizawa et. al., Phys. Rev. B 61, R854 (2000).

[4] Zhijun Xu, et. al, Phys. Rev. Lett. 113, 177002 (2014).

[5] H. Jacobsen, et. al., Phys. Rev. Lett. 120, 037003 (2018).

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