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Stripe discommensuration and spin dynamics in Pr_{3/2}Sr_{1/2}NiO₄

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Inelastic neutron scattering studies on the magnetic excitation in a stripe-ordered Pr_{3/2}Sr_{1/2}NiO₄ at 5K reveal that the magnetic incommensurability ($\epsilon = 0.4$) as result of admixing stripe dicommensuration in the checkerboard matrix in NiO₂ plane. A suggested linear spin-wave model accounting 3D-stripe discommensuration with two-fold exchange interactions between Ni²⁺ spins, provides a good agreement with the measured spin wave dispersion up to 64 meV, notably, to describe a slight symmetric shift of the broadened peak in the energy range from 35 to 45 meV. Our results indicate that discommensuration model is essential to consolidate in the LSWT calculation to understand the microscopic effect of doped holes to the spin microstructure.

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