Low-energy dispersion of dynamic charge stripes in La$_{1.75}$Sr$_{0.25}$NiO$_4$ observed with inelastic neutron scattering$^1$ RUIDAN ZHONG, JOHN TRANQUADA, GENDA GU, Brookhaven Natl Lab, DMITRY REZNIK, University of Colorado, BARRY WINN, Oak Ridge Natl Lab — The dynamic stripe correlations have been the subject of intense research, owing to the possible links with high-$T_c$ superconductivity. In light of a recently published, direct observation of charge-stripe fluctuations in La$_{2-x}$Sr$_x$NiO$_4$ using inelastic neutron scattering$^2$, we did a follow-up neutron experiment on a $x=0.25$ sample to characterize the low-energy dispersion of these dynamic charge stripes using the HYSPEC instrument at the Spallation Neutron Source. The scattering signals are collected in the vicinity of a charge-order peak with a large wave vector (4.4, 3, 0), where dynamic spin-stripe correlations are negligible. Mapping the low-energy charge-stripe fluctuations in a wide temperature range, we observe a finite dispersion along the stripe-modulation direction at $T \geq 160$K where the charge stripes become disordered, while the steep dispersion in the orthogonal direction is not resolved.

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