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High-Energy Excitations near the boundary to antiferromagnetism-YBCO6.35 C. STOCK, Physics Department, Johns Hopkins University, R.A. COWLEY, Oxford Physics, Oxford University, W.J.L. BUYERS, National Research Council, Chalk River, C.L. BROHOLM, Physics Department, Johns Hopkins University, R. COLDEA, Oxford Physics, Oxford University, C.D. FROST, Appleton Rutherford Laboratories, R.J. BIRGENEAU, Physics Department, University of California Berkeley, R. LIANG, D. BONN, W.N. HARDY, Physics Department, University of British Columbia —
The high-energy magnetic excitations in the cuprate superconductors have attracted considerable interest recently. We investigate magnetic excitations over the entire energy range in the heavily underdoped YBCO6.35 superconductor with a Tc=18 K. The spin response below 25 meV energy transfers is broad and has been discussed previously. The magnetic response above 25 meV is very similar to the parent insulators with similar spectral weight and spin-wave velocity. The excitations near the zone boundaries are however, much broader in energy than for the parent insulator. The onset of damping coincides approximately with the gap determined from transport measurements. This indicates that a new decay channel for spin waves becomes available above the pseudo-gap.

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