

Abstract Submitted  
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**The Persistence of High-Frequency Spin Fluctuations in Overdoped Superconducting  $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$  ( $x=0.22$ )** O.J. LIPSCOMBE, B. VIGNOLLE, S.M. HAYDEN, H.H Wills Physics Laboratory, Tyndall Avenue, Bristol, BS8 1TL, UK, D.F. MCMORROW, London Centre for Nanotechnology and Department of Physics and Astronomy, University College London, London WC1E 6BT, UK, T.G. PERRING, ISIS Facility, Rutherford Appleton Laboratory, Chilton, Didcot OX11 0QX, UK — The wavevector and energy dependence of the spin fluctuations in overdoped superconducting  $\text{La}_{1.78}\text{Sr}_{0.22}\text{CuO}_4$  ( $T_c=26$  K) were investigated up to high energy (160 meV) by inelastic neutron scattering. Overdoping was found to suppress the strong magnetic response  $\chi''(\mathbf{q}, \omega)$  present in optimally doped  $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$  which is peaked near 50 meV. The magnetic excitations were less dispersive than in the optimal compound and incommensurate at all energies investigated. Overdoping did not appear to weaken the high-frequency  $E \geq 100$  meV response, suggesting that significant antiferromagnetic exchange couplings persist well into the overdoped part of the cuprate phase diagram.

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