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Discovery of slowly fluctuating magnetic fields by MuSR in cuprates[1] LEI SHU, J. ZHANG, Z.F. DING, C. TAN, K. HUANG, Fudan Univ., Shanghai 200433, China, D. E. MACLAUGHLIN, C. M. VARMA, Univ. of California, Riverside, Ca 92521, USA, A. D. HILLIER, P. BISWAS, ISIS facility, Rutherford Appleton Laboratory, Oxfordshire, OX11 0QX, UK, O. O. BERNAL, California State Univ., Los Angeles, Ca 90032, USA, P.-C. HO, California State Univ., Fresno, Ca 93740, USA, H. XIANG, X. YAO, Shanghai Jiao Tong Univ., Shanghai 200240, China — The origin of a mysterious pseudogap region in high-T_c superconductors is a challenging issue. The proposed time-reversal breaking order through loop-currents is consistent with five different classes of symmetry-sensitive experiments: polarized neutron scattering, Kerr effect, bireferingence, dichroic ARPES, and second harmonic generation. However, local probes such as μSR and NMR do not see the magnetic fields expected for such an order. Such local probes have much longer time scales than the others. It has been suggested that the local magnetic fields may be motionally narrowed by fluctuations among the different possible directions of the loop-current order. We have performed zero field and longitudinal field μSR measurements on $YBa_2Cu_3O_y$ (T_c = 73K, 80K, 88K, and 91K) single crystals. A magnetic field with rms width of about 20 Gauss fluctuating at about 10^8 Hz has been discovered, consistently at similar temperatures (T^*) as the onset of order in the other experiments. Critical slowing down of magnetic fluctuation near T^* has also been found.

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