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Magnetic X-ray Scattering from Cuprates[1] Z. ISLAM, D. HASKEL, J.C. LANG, G. SRAJER, Advanced Photon Source, ANL, X. LIU, S.K. SINHA, U. of California, San Diego, B.W. VEAL, Materials Science Division, ANL — Magnetic x-ray scattering studies of ordered spin-$\frac{1}{2}$ copper moments in cuprates have been difficult to perform. While resonant scattering has been studied in one sample of Pr-barium cuprate (*PRB* **61**, 1251 (2000)), a direct observation of non-resonant scattering from cuprates (*e.g.* $YBa_2Cu_3O_{6+x}$, YBCO) has not been made. We have succeeded in observing non-resonant magnetic scattering of x- rays from antiferromagnetically ordered YBCO insulators. Magnetic Bragg peaks characterized by ($\frac{1}{2}$, $\frac{1}{2}$, 0) were found to be resolution limited in all directions revealing correlation lengths of ∼1000 A. By using a polarization analyzer to exactly suppress charge scattering we were able to obtain a peak-to-background ratio of ∼7 with a peak count rate of 2- 3 counts/second. Q-dependence of the intensities is consistent with the known structure and scattering cross section. Our study demonstrates the feasibility of such a technique at a third generation synchrotron source, which can be used for studying very small samples.

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