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**Field Effect on the Superconducting Magnetic Gap in $\mathbf{Nd_{2-x}Ce_xCuO_4}$** E.M. MOTOYAMA, P.K. MANG, G. YU, Stanford University, D. PETITGRAND, Laboratoire Leon Brillouin, CEA Saclay, France, O.P. VAJK, NIST Center for Neutron Research, M. GREVEN, Stanford University — Superconductivity in the cuprates occurs in close proximity to antiferromagnetic phases, and determining the nature of these phases is essential in arriving at a satisfactory understanding of these complex oxides. A unique opportunity exists in the prototypical electron-doped compound $Nd_{2-x}Ce_xCuO_4$ (NCCO), for which the upper critical field is relatively small ($\sim$ 10 T). Although a magnetic field enhances the elastic response at the antiferromagnetic position $(\pi, \pi)$, it has been shown [1] that this effect is the paramagnetic response of the epitaxial secondary phase $(Nd,Ce)_2O_3$, and not due to the weakening of superconductivity. Our recent inelastic neutron scattering results demonstrate a real field effect on the magnetic excitations at $(\pi, \pi)$. It is known that in NCCO, these excitations become gapped below the superconducting critical temperature $T_c$ [2]. Here, we report on the effect of a magnetic field on this gap. In addition to the field-effect results, we report on the doping-dependence of two-dimensional antiferromagnetic correlations in non-superconducting oxygen-reduced NCCO, and compare the results to previous studies on as-grown NCCO [3]. [1] P.K. Mang et al, Nature 426, 139 (2003); Phys. Rev. B 70, 094507 (2004). [2] K. Yamada et al., Phys. Rev. Lett. 90, 137004 (2003). [3] P.K. Mang et al, Phys. Rev. Lett. 93, 027002 (2004).

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