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Polarized Neutron Diffraction to discover symmetry breaking in pseudogap region of Y(123)-Cuprate

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One of the leading issues in high-T_C superconductors is the origin of the pseudogap phase in underdoped cuprates. Using polarized elastic neutron diffraction, we identify a novel magnetic order in the $YBa_2Cu_3O_{6+x}$ system*. The observed magnetic order preserves translational symmetry as proposed for orbital moments in the circulating current theory of the pseudogap state (see C.M. Varma, at http://fr.arxiv.org/abs/cond-mat/0507214). To date, it is the first direct evidence of an hidden order parameter characterizing the pseudogap phase in high-T_C cuprates.

* B. Fauqué, Y. Sidis, V. Hinkov, S. Pailhès, C.T. Lin, X. Chaud and P. Bourges, at http://fr.arxiv.org/abs/cond- mat/0509210.