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New magnetic structures in novel and conventional manganites AZIZ DAOUD-ALADINE, STFC Rutheford Appleton Laboratories, JUAN RODRÍGUEZ-CARVAJAL, CRISTIAN PERCA, LOREYNNE PINSARD-GAUDART — The determination of the magnetic structures of manganites has always been at the root of their fundamental understanding [1]. We studied the magnetic structures of half-doped charge ordered manganites that are either show the prototype [1] CE-type magnetic structure ($Pr_{1/2}Ca_{1/2}MnO_3$), or variants of this order ($YBaMn_2O_6$ [2] and $Pr_{0.6}Ca_{0.4}MnO_3$) with neutron diffraction. The study of $Pr_{1/2}Ca_{1/2}MnO_3$ (ILL, France) is the first ever done on a single crystal and it essentially confirms the pioneering picture [1], whereas the NPD studies of $YBaMn_2O_6$ [2] (PSI, Switzerland) and $Pr_{0.6}Ca_{0.4}MnO_3$ [3] (ISIS, UK), give two unprecedented results. The $YBaMn_2O_6$ magnetic structure corroborates the hotly debated ordering of Zener Polarons [4], and high resolution NPD data evidence a new spin reorientation transition around T$\sim$20K far below its TN$\sim$ $170K$ in $Pr_{0.6}Ca_{0.4}MnO_3$ [3] that has so far only been vaguely observed. We will discuss the consequences that these results have on the still hotly debated understanding of the connection between charge/orbital and spin orderings in the manganites. [1] Wollan, E.O. and Koehler, W.C. Rev. 100, 545 (1955) [2] A. Daoud-Aladine et al., Phys. Rev. Lett.: 101 166404 (2008) [3] A. Daoud-Aladine et al., unpublished [4] M. Coey Nature 430, 155-157 (8 July 2004)

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