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New tetragonal magnetic phase in (Ba,K)Fe_2As_2 ANNA BÖHMER[1], FRÉDÉRIC HARDY, LIRAN WANG, PETER SCHWEISS, THOMAS WOLF, CHRISTOPH MEINGAST, Institut für Festkörperphysik, Karlsruhe Institute of Technology, Germany — The recently discovered C_4-symmetric magnetic phase in (Ba,Na)Fe_2As_2 [2] is a rare exception among iron-based superconductors, which usually display a stripe-type spin-density wave (SDW) ground state at low doping. We re-examine the phase diagram of the closely related (Ba,K)Fe_2As_2 in great detail, using high-quality single crystals and thermodynamic (thermal-expansion and specific-heat) measurements. We find a small region of a, previously missed, C_4-symmetric phase in the ambient-pressure phase diagram, likely related to an unidentified phase transition observed under hydrostatic pressure[3]. We investigate the remarkable interplay of the new C_4 phase with superconductivity and with the SDW phase by studying the electronic entropy and the effect of uniaxial pressure on the phase diagram.

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[2]Avci et al., Nature Commun. 5, 3845 (2014)
[3]Hassinger et al., Phys. Rev. B 86 140502 (2012)

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