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Competition between magnetic order and superconductivity in Fe oxy-pnictides SAMUELE SANNA, Physics Department and CNISM University of Pavia, Italy, P. CARRETTA, G. PRANDO, A. RIGAMONTI, R. DE RENZI, T. SHIROKA, G. LAMURA, M. PUTTI, A. MARTINELLI, R. CIMBERLE, M. TROPEANO, C. FERDEGHINI, A. PALENZONA, UNIVERSITY OF PAVIA TEAM, UNIVERSITY OF PARMA TEAM, UNIVERSITY OF GENOVA AND SPIN-CNR TEAM, ETH OF ZURICH TEAM — We have microscopically investigated the interplay between magnetism (M) and superconductivity (SC) of the RFeAsO (1111) oxy-pnictide for R=La, Sm and Ce as a function of F doping, isoelectronic Fe/Ru substitution and external pressure. In contrast to earlier data, our results suggest a unique behaviour in different 1111 families at the M-SC crossover, showing a sharp crossover between the two types of order as a function of F doping [1-3]. In the optimally e⁻-doped SmFe_{1-x}Ru_xAsO_{0.85}F_{0.15} compound, magnetic order appears in the FeAs layers for 0.1 < x < 0.5, together with a concomitant dramatic reduction of the superconducting transition temperature [3]. Both these features suggest a strong competition between the magnetic and superconducting order parameters within the FeAs layers of 1111 oxypnictides.

[1] S. Sanna et al., PRB 80 (2009) 052503.

[2] S. Sanna et al., PRB 82 (2010) 060508R.

[3] Manuscript in preparation.

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