Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Strong correlations and the search for high-Tc superconductivity in chromium pnictides and chalcogenides[1] ELENA BASCONES, MARIA JOSÉ CALDERÓN, JOSE MARIA PIZARRO, Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC), JIAN LIU, Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC) and Shadong University, MARIA DEL CARMEN MUÑOZ, Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC) — Undoped iron superconductors accommodate $n = 6$ electrons in five d-orbitals. Experimental and theoretical evidence shows that the strength of correlations increases with hole-doping, as the electronic filling approaches half-filling with $n = 5$ electrons. This evidence delineates a scenario in which the parent compound of iron superconductors is the half-filled system, in analogy to cuprate superconductors. In cuprates the superconductivity can be induced upon electron or hole doping. In this work we propose to search for high-Tc superconductivity and strong correlations in chromium pnictides and chalcogenides with $n < 5$ electrons. By means of ab-initio, slave spin and multi-orbital RPA calculations we analyse the strength of the correlations and the superconducting and magnetic instabilities in these systems with main focus on LaCrAsO. We find that electron-doped LaCrAsO is a strongly correlated system with competing magnetic interactions, being (π, π) antiferromagnetism and nodal d-wave pairing the most plausible magnetic and superconducting instabilities, respectively.

[1]Mineco via FIS2012-33521, FIS2014-53218-P, FIS2015-64654-P, MAT2015-66888-C3-1-R, Ramón Areces, Natural Science Foundation of China (11374186 51231007) and the China Scholarship Council

Elena Bascones
Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC)

Date submitted: 10 Nov 2016 Electronic form version 1.4