

Abstract Submitted  
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**The happy marriage between electron-phonon superconductivity and Mott physics in  $\text{Cs}_3\text{C}_{60}$ : A first-principle phase diagram** MASSIMO CAPONE, International School for Advanced Studies (SISSA) and CNR-IOM, YUSUKE NOMURA, Ecole Polytechnique, SHIRO SAKAI, Riken Center for Emergent Matter Science, Japan, GIANLUCA GIOVANNETTI, CNR-IOM and International School for Advanced Studies (SISSA), RYOTARO ARITA, Riken Center for Emergent Matter Science, Japan — The phase diagram of doped fullerenes like  $\text{Cs}_3\text{C}_{60}$  as a function of the spacing between fullerene molecules is characterized by a first-order transition between a Mott insulator and an s-wave superconductor with a dome-shaped behavior of the critical temperature. By means of an ab-initio modeling of the bandstructure, the electron-phonon interaction and the interaction parameter and a Dynamical Mean-Field Theory solution, we reproduce the phase diagram and demonstrate that phonon superconductivity benefits from strong correlations [1] confirming earlier model predictions [2]. The role of correlations is manifest also in infrared measurements carried out by L. Baldassarre [3]. The superconducting phase shares many similarities with "exotic" superconductors with electronic pairing, suggesting that the anomalies in the "normal" state, rather than the pairing glue, can be the real common element unifying a wide family of strongly correlated superconductors including cuprates and iron superconductors. [1] Y. Nomura, S. Sakai, K. Nakamura, M. Capone, and R. Arita, *Science Advances* 1, e1500568 (2015) [2] M. Capone et al., *Science* 296, 2364 (2002); M. Capone et al., *Rev. Mod. Phys.* 81, 943 (2009) [3] L. Baldassarre et al. *Sci. Rep.* 5, 15240 (2015)

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