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Competition between antiferromagnetism and superconductivity, electron-hole doping asymmetry and "Fermi Surface" topology in cuprates[1] SANDEEP PATHAK, Indian Institute of Science, VIJAY SHENOY, IISc Bangalore and Ohio State, NANDINI TRIVEDI, MOHIT RANDERIA, The Ohio State University — We study the asymmetry between electron and hole doping in a 2D Mott insulator, and the resulting competition between antiferromagnetism (AF) and d-wave superconductivity (SC), using variational Monte Carlo for projected wave functions. We find that key features of the $T = 0$ phase diagram, such as critical doping for SC-AF coexistence and the maximum value of the SC order parameter, are determined by a single parameter η which characterizes the topology of the "Fermi surface" at half filling defined by the bare tight-binding parameters. Our results give insight into why AF wins for electron doping, while SC is dominant on the hole doped side. We also suggest using band structure engineering to control the η parameter for enhancing SC.

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