Superconductivity and Gutzwiller correlations in a two band Hubbard-Fröhlich model[1] TAO QIN, SISSA, Italy, MICHELE FABRIZIO, SISSA, CNR-IOM Democritos and ICTP Trieste, Italy, S. SHAHAB NAGHAVI, SISSA, Italy, ERIO TOSATTI, SISSA, CNR-IOM Democritos and ICTP Trieste, Italy, CONDENSED MATTER PHYSICS TEAM — We studied the two-band Hubbard-Fröhlich model with the hopping parameters from the first-principle calculation for La-Phenanthrene. The mean-field approximation shows that two-band superconductivity with opposite signs is possible even with the presence of a large Hubbard U. Using Gutzwiller approximation, we show that the Hubbard U can help the superconductivity in this system. When U is too large, it will go into the insulator state. Roughly, we determined the critical U for this superconductor-insulator (SI) transition. We further shows that before the SI transition, the antiferromagnetic order will come into being. However, there is still a large range of U for the superconductivity to win. We also discussed the possibility to apply our model to other polycyclic aromatic hydrocarbons.

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