Fractionalized Fermi liquids in a quantum dimer model

JUN-HYUN LEE, Harvard University, STEVEN WHITE, University of California, Irvine, SUBIR SACHDEV, Harvard University — We consider a quantum dimer model with bosonic and fermionic dimers, proposed to describe the pseudogap phase of cuprates.

By density matrix renormalization group calculations on a finite cylinder, we obtain the ground state density distribution of the fermionic dimers for a number of different total densities. From the Friedel oscillations at open boundaries, we deduce that the Fermi surface consists of small hole pockets near $\pi/2, \pi/2$, and this feature persists up to 1/8 doping. Our results support the existence of a “fractionalized Fermi liquid” in this model. We also discuss the form factors of the density modulations.