Is there a need for a new model of high-Tc superconductivity? A fresh look at both tunneling and ARPES spectra answers yes!

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In addition to tunneling, angle resolved photoemission spectroscopy (ARPES) has furnished clear and reproducible data on cuprates in the superconducting state at low temperature (the ground state) and as a function of temperature (excited states).

In a spectacular way, ARPES has confirmed the presence of a partial Fermi surface (Fermi arcs) at the critical temperature Tc, as well as the well-known pseudogap above Tc. The main contributors have been Campuzano (Argonne), Hashimoto, Shen (Stanford), Fujimori (Tokyo) and Ino (Hiroshima).

While there are many proposals for the enigmatic pseudogap (SC fluctuations, spin or charge ordering, etc.) a simple explanation for the Fermi arcs is completely lacking. In my talk I will discuss these issues and suggest that the preformed pair model (pairons) is in very good agreement with the experimental observations.