

Indian Statistical Institute, Chennai Centre

Seminar Announcement / संगोष्ठी की घोषणा

Date/ तारीख : 21st October, 2016

Time/ समय : 4pm – 5pm.

Venue/ स्थान : SETS Auditorium, ISI-Chennai.

Speaker/ वक्ता : Dr. Madhuparna Karmakar

Title/ शीर्षक: Population imbalanced Fermi superfluid

Abstract: For an electron system in a superconducting state the Meissner effect characterizes the response to a magnetic field. In type-II superconductors there is flux penetration beyond a threshold h_{c1} in the form of an Abrikosov lattice before superconductivity (SC) is finally lost at the orbital critical field h_{c2}^{orb} . The magnetic field also couples to the spin of the electrons and tends to break the Cooper pair. This effect is detrimental to SC, and, if orbital effects were irrelevant, SC order would be lost at some “Pauli-limiting” field, h_{c2}^P . The ratio of these critical fields, $\alpha=h_{c2}^{orb}/h_{c2}^P$, defines the Maki parameter. In most superconductors $\alpha \ll 1$, so the Pauli suppression effects never show up. There are, however, scenarios where it becomes relevant.

In this talk I would discuss about the situation where Pauli limiting behavior indeed becomes relevant. It would be shown that superfluidity in such a scenario no longer remains restricted to an homogeneous BCS like state. Population imbalance gives rise to coexisting magnetic and superfluid order at low polarizations leading to the 'breached pair' state, while beyond a critical polarization the system transits to a modulated superfluid (FFLO) state with finite momentum pairing between the fermions. With tools which can access fluctuations beyond the mean field theory I would map out the resulting phase diagram in comparison with the experimental observations. Further, the novel spectral features expected to be observed in the FFLO superfluid state would also be discussed in this talk.

सभी को आमंत्रित कर रहे हैं | All are invited.

Seminar Coordinator

