UCLA

Department of Physics & Astronomy Colloquium

Thursday, November 30, 2006
3:30-4:30 PM 1-434 PAB

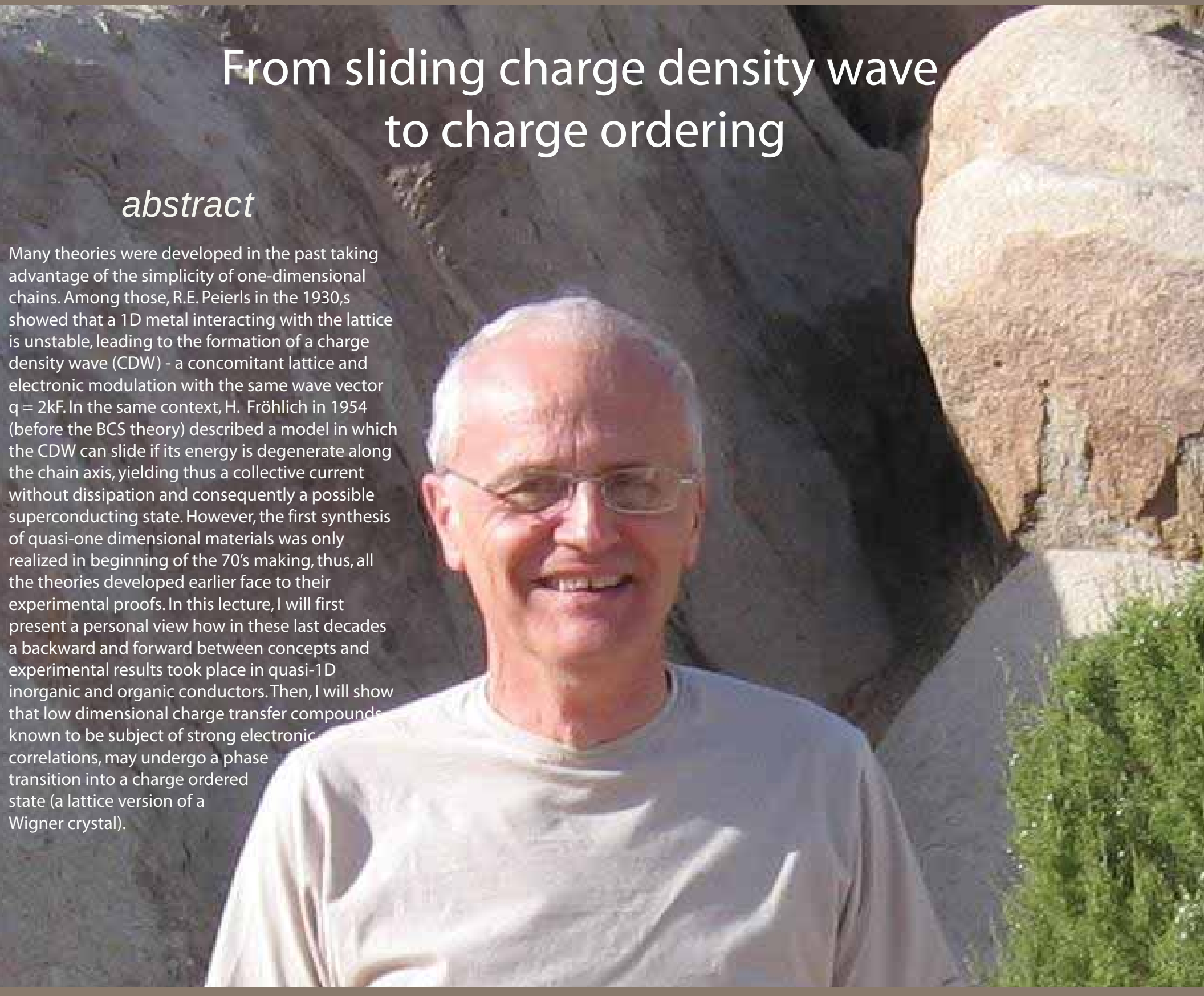
Pierre Monceau

CNRS, Directeur de Recherches (exceptional class-1) Grenoble, France
2006 Regents, Lecturer in the Department of Physics & Astronomy

From sliding charge density wave to charge ordering

abstract

Many theories were developed in the past taking advantage of the simplicity of one-dimensional chains. Among those, R.E. Peierls in the 1930,s showed that a 1D metal interacting with the lattice is unstable, leading to the formation of a charge density wave (CDW) - a concomitant lattice and electronic modulation with the same wave vector q = 2kF. In the same context, H. Fröhlich in 1954 (before the BCS theory) described a model in which the CDW can slide if its energy is degenerate along the chain axis, yielding thus a collective current without dissipation and consequently a possible superconducting state. However, the first synthesis of quasi-one dimensional materials was only realized in beginning of the 70's making, thus, all the theories developed earlier face to their experimental proofs. In this lecture, I will first present a personal view how in these last decades a backward and forward between concepts and experimental results took place in quasi-1D inorganic and organic conductors. Then, I will show that low dimensional charge transfer compounds known to be subject of strong electronic correlations, may undergo a phase transition into a charge ordered state (a lattice version of a Wigner crystal).



Refreshments to follow in Room 2-222
- Leonard Lounge - Knudsen