pl4 **Structural Features and Instabilities in Low Dimensional Electronic Conductors**. J.-P. Pouget, *Laboratoire de Physique des Solides (CNRS UMR 8502) Université Paris-Sud 91405 Orsay, France.*
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In presence of an electron–phonon coupling a quasi-one dimensional conductor (quasi-1D) exhibits a Peierls instability towards the formation of charge density waves (CDW). The CDW associates a modulation of the electronic density with a lattice displacement wave at the critical wave vector $2k_F$, where k_F is the Fermi wave vector of the quasi-1D conduction electron gas. The structural counterpart of the CDW is detected by diffraction methods. The Peierls transition generally leads to incommensurate modulated structures.

In presence of strong electron-electron interactions a new kind of CDW instability appears at the critical wave vector $4k_F$. It corresponds to a Wigner localisation of the charge degrees of freedom. In addition, for localised electrons, the Peierls instability evolves towards the spin-Peierls instability where, by dimerisation of the $4k_F$ lattice , the spin degrees of freedom become paired into a non-magnetic ground state.

In this talk we shall illustrate these various instabilities by examples taken both from organic conductors and transition metal oxide bronzes. In particular it will be shown that a hidden nesting mechanism of the Fermi surface can stabilise successive CDW in the 2D oxide bronzes.

Above the Peierls or spin Peierls transition the structural instability is announced by a sizeable regime of pretransitional quasi-1D structural fluctuations which can be detected by X-ray diffuse scattering experiments. The quantitative analysis of this diffuse scattering allows to extract microscopic parameters of the 1D electronic subsystem.

Finally impurities can pin the phase of the CDW and even deform it in their vicinity. The strong pinning of the CDW by the defects gives rise to an intensity asymmetry and a profile asymmetry of the diffuse scattering which allow to determine the phase at the impurity position and the sign of the CDW deformation respectively. A quantitative analysis of the diffuse scattering observed in the V-doped blue bronze shows that the screening of the V-charged impurities is achieved via the formation of Friedel oscillations.

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