RECENT IDENTIFICATIONS OF MICROSCOPIC SOLITONS IN QUASI 1D ELECTRONIC SYSTEMS AND GENERALISATIONS TO HIGHER DIMENSIONS.

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We review a progress in experiments and theory, elucidating the role of microscopic solitons in quasi-1D electronic systems with a symmetry breaking. The new interest rises from studies of the “electronic ferroelectricity” in organic conductors, and from nano-scale tunneling experiments in Charge Density Wave (CDW) materials. Individual solitons have been visually captured in recent STM experiments. On this basis we extrapolate to a picture of combined topological excitations in general strongly correlated systems: from dopped antiferromagnets to strong coupling and spin-polarized superconductors. At more macroscopic scales, we recover the electronic vortices generated in mesa-junctions, and domain walls evolving in femtosecond pump-probe experiments.