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Séminaire GREMAN

JEUDI

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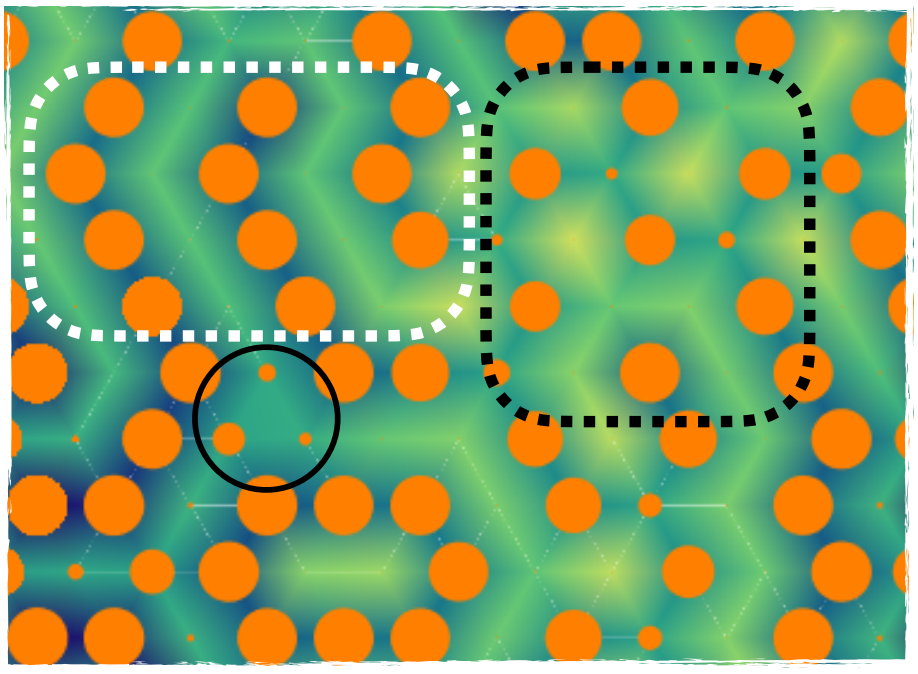
SEPTEMBRE



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Bad metal behavior from slow collective dynamics

14h - 15h (amphi F23 - Grandmont)

The scattering of charge carriers by slow degrees of freedom can drive electronic systems away from their normal transport behavior, causing anomalously large resistivities. At the basis of this phenomenon lies the idea that localization corrections, that are known to make the conductivity vanish in disordered systems, also partially survive when the random environment is dynamical. This quantum phenomenon is capable of reducing the carrier conductivity below the semiclassical value, provided that the scatterers (phonons or any other collective bosonic excitations) are sufficiently slow.

The phenomenology described here, dubbed "transient localization", has been successful in explaining the anomalous transport behavior of organic semiconductors, where the role of a dynamical random environment is played by slow molecular vibrations. Because it can cause a large enhancement of the resistivity, transient localization could also be a natural candidate to explain bad metal behavior in correlated electron systems. In particular, it would naturally explain the emergence of Displaced Drude Peaks in the optical absorption spectra, as commonly observed in experiments in a variety of materials.

In this talk I shall review recent and ongoing work aimed at applying the concept of transient localization to correlated systems and other bad/strange metals, and discuss likely sources of dynamical disorder that could be at the origin of the phenomenon. If time allows, I will describe how the viscous slowing down of collective charge fluctuations can lead to glassiness in interacting systems in the absence of disorder.