

Abstract Submitted
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Anomalous transport in nanotubes with resonant adsorbates¹ DI-DIER MAYOU, PETRUTA ANGHEL-VASILESCU, Institut Néel CNRS and Université Grenoble Alpes, GUY TRAMBLY DE LAISSARDIÈRE, Laboratoire de Physique Théorique et Modélisation, CNRS and Université de Cergy-Pontoise, 95302 Cergy-Pontoise, France, SIN TEAM, THEORY GROUP TEAM — We analyze the quantum diffusion in metallic nanotubes with resonant adsorbates distributed at random with a finite concentration. We show that these nanotubes present a reinforced density of states at the charge neutrality point in a similar way to what is found in grapheme. For wave-packets with various energies the quantum diffusion shows a tendency to localization with a localization length that depends strongly on the energy of the wave-packet. For energies in the peak of the density of state, that is close to the charge neutrality point, the quantum diffusion behaves differently and follows a power law of the time. This suggest that states near the neutrality point are not exponentially localized but are somehow less localized. This behavior is reminiscent of the divergence of the localization length predicted for 2D graphem [1]. Consequences for transport in nanotubes and nanoribbons are briefly discussed [2].

[1] G.Trambly de Laissardière and D. Mayou Phys. Rev. Lett. 111, 166601 (2013)

[2] Baringhaus et al. , Nature 506, 349 (2014)

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