Volkov-Pankratov states in topological graphene nanoribbons

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In topological systems, a modulation in the gap onset near interfaces can lead to the appearance of massive edge states, as were first described by Volkov and Pankratov. In this talk I will show that, in the presence of intrinsic spin-orbit coupling smoothly modulated near the system edges, graphene nanoribbons host Volkov-Pankratov states in addition to the topologically protected helical states. This result is obtained by means of two complementary methods, one based on the effective low-energy Dirac equation description and the other on a fully numerical tight-binding approach, with excellent agreement between the two. I will then briefly discuss how transport measurements might reveal the presence of Volkov-Pankratov states, and possible graphene-like structures in which such states might be observed.