

Abstract Submitted
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Fractional statistics of topological defects in graphene and related structures¹ BABAK SERADJEH, MARCEL FRANZ, University of British Columbia — We show that fractional charges bound to topological defects in the recently proposed time-reversal-invariant models of spinless fermions on the honeycomb lattice with Kekule distortion and on the π -flux square lattice with Peierls distortion obey fractional statistics. The continuum effective low-energy description is given in terms of a ‘doubled’ level-2 Chern-Simons field theory, which is parity and time-reversal invariant and implies two species of semions (particles with statistical angle $\pm\pi/2$) labeled by a new emergent quantum number that we identify as the fermion axial charge.

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