

ANALYTIC HYPOELLIPTICITY IN THE CHIRAL MODEL OF TWISTED BILAYER GRAPHENE

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Abstract: Magic angles are a topic of current interest in condensed matter physics: when two sheets of graphene are twisted by those angles the resulting material is superconducting. In this talk, we shall discuss a simple operator describing the chiral limit of twisted bilayer graphene, whose spectral properties are thought to determine which angles are magical. It comes from a 2019 PR Letter by Tarnopolsky–Kruchkov–Vishwanath. By adapting analytic hypoellipticity results of Kashiwara, Trepreau, Sjöstrand, and Himonas, we show that the corresponding eigenfunctions decay exponentially in suitable geometrically determined regions, as the angle of twisting decreases. This is joint work with Maciej Zworski.