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Numerical simulation of Dirac semimetals

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Dirac semimetals are recently discovered materials with low energy
spectrum similar to the massless two flavour 3+1D Dirac fermions. The interaction
between quasiparticles in Dirac semimetals is instantaneous Coulomb
with large effective coupling constant \alpha\sim 1. In this report we present the
result of study of the phase diagram of Dirac semimetals within lattice
simulation with rooted staggered fermions. In particular, calculate the chiral
condensate as a function of effective coupling constants and thus determine
the position of semimetal-insulator transition in Dirac semimetals.

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