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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.

Primary authors: Mr NIKOLAEV, Aleksandr (ITEP); Mr KOTOV, Andrey (ITEP); KATSNELSON, Mikhail (Radboud University); ZUBKOV, Mikhail (Universite de Tours); Mr BRAGUTA, Victor (ITEP)

Presenter: Mr KOTOV, Andrey (ITEP)

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