

Abstract Submitted
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Optical signatures of a hypercritical 1D potential in a 2D Dirac metal BOR-YUAN JIANG, GUANGXIN NI, Univ of California - San Diego, CHENG PAN, Univ of California - Riverside, ZHE FEI, Univ of California - San Diego, BIN CHENG, CHUN NING LAU, MARC BOCKRATH, Univ of California - Riverside, DIMITRI BASOV, MICHAEL FOGLER, Univ of California - San Diego — Generation of quasi-bound states in graphene near strong charged perturbations is a solid-state analog of atomic collapse of superheavy elements or particle production by hypothetical cosmic strings. We show, for the case of a linelike perturbation, that as the perturbation grows in strength, quasi-bound states are generated sequentially. Each of these critical events is signaled by a sharp change in the local optical conductivity. Tunable linelike perturbations can be realized in experiment using nanowire or nanotube electrostatic gates. We report measurements of local conductivity for such systems obtained through near-field optical microscopy.

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