Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Observing Atomic Collapse in Graphene YANG WANG, DILLON WONG, Physics Dept. UC Berkeley, LBNL, ANDREY SHYTOV, Shool of Physics, Univ. of Exeter, VICTOR BRAR, Physics Dept. UC Berkeley, LBNL, SANGKOOK CHOI, Physics Dept. UC Berkeley, QIONG WU, Physics Dept. UC Berkeley, LBNL, HSIN-ZON TSAI, Physics Dept. UC Berkeley, WILLIAM REGAN, ALEX ZETTL, Physics Dept. UC Berkeley, LBNL, ROLAND KAWAKAMI, Dept. of physics and astronomy, UC Riverside, STEVEN LOUIE, Physics Dept. UC Berkeley, LBNL, LEONID LEVITOV, Dept. of Physics, MIT, MICHAEL CROMMIE, Physics Dept. UC Berkeley, LBNL — Relativistic quantum mechanics predicts that super-heavy atoms possess unique properties not shared by ordinary atoms. In particular, a very strong electric field around the nucleus should result in "atomic collapse," with an electron component falling onto the nucleus and a positron component escaping to infinity. Predicted by Dirac 80 years ago, atomic collapse has thus far remained experimentally out of reach using accelerator-based techniques. Here we report the observation of atomic collapse on gated graphene devices. The energy and spatial dependence of the atomic collapse state was measured using scanning tunneling microscopy (STM).

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Date submitted: 07 Nov 2012 Electronic form version 1.4