Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Gamma Rays from Fast Black-Hole Winds CHRIS KARWIN, MARCO AJELLO, Clemson University , REBECCA DIESING, DAMIANO CAPRIOLI, University of Chicago, FERMI-LAT COLLABORATION — Massive black holes at the centers of galaxies can launch powerful wide-angle winds that, if sustained over time, can unbind the gas from the stellar bulges of galaxies. These winds may be responsible for the observed scaling relation between the masses of the central black holes and the velocity dispersions of stars in galactic bulges. Propagating through the galaxy, the wind should interact with the interstellar medium creating a strong shock, similar to those observed in supernovae explosions, which is able to accelerate charged particles to high energies. Here we report the Fermi Large Area Telescope detection of gamma-ray emission from these shocks in a small sample of galaxies exhibiting energetic winds. The detection implies that energetic black-hole winds transfer 0.04

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Date submitted: 08 Jan 2021 Electronic form version 1.4