

Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Experimental signatures of a new dark matter WIMP ROLAND ALLEN, REAGAN THORNBERRY, MAXWELL THROM, JOHN KILLOUGH, DYLAN BLEND, MICHAEL ERICKSON, BRIAN SUN, BRETT BAYS, GABRIEL FROHAUG, Texas A&M University — The dark matter WIMP proposed here has the following properties: (1) Its mass is ≤ 125 GeV. (2) It will yield the observed dark matter abundance if its mass is ~ 75 GeV. (3) The cross-section for nuclear scattering is consistent with the limits from direct detection experiments, (4) the cross-section for collider production is consistent with limits from the LHC, and (5) the cross-section for annihilation is consistent with the general (multiple-channel) limits from gamma-ray observations of dwarf spheroidal galaxies. The mass and annihilation cross-section (through 29 different channels) are in agreement with (6) analyses of the observations of gamma rays from the Galactic center by Fermi-LAT and (7) analyses of the antiprotons observed by AMS-02 (with both supporting the hypothesis of WIMP annihilation). (8) The most promising signature for collider detection appears to be missing transverse energy of 150 GeV following creation through vector boson fusion. (9) The best hope for direct detection is still Higgs exchange. (10) The present dark matter particle and the lightest neutralino of supersymmetry (susy) can stably coexist in a multicomponent dark matter scenario. This new dark matter candidate results from an extended Higgs sector with or without susy.

Roland Allen
Texas A&M University

Date submitted: 07 Jan 2021

Electronic form version 1.4