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A dark matter WIMP that can be detected and definitively identified with currently planned experiments

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A recently proposed dark matter WIMP [1] has only second-order couplings to gauge bosons and itself. As a result, it has small annihilation, scattering, and creation cross-sections, and is consequently consistent with all current experiments and the observed abundance of dark matter. These cross-sections are, however, still sufficiently large to enable detection in experiments that are planned for the near future, and definitive identification in experiments proposed on a longer time scale. The (multi-channel) cross-section for annihilation is consistent with thermal production and freeze-out in the early universe, and with current evidence for dark matter annihilation in analyses of the observations of gamma rays by Fermi-LAT and antiprotons by AMS-02, as well as the constraints from Planck and Fermi-LAT. The cross-section for direct detection via collision with xenon nuclei is estimated to be slightly below 10^{-47} cm^2, which should be attainable by LZ and Xenon nT and well within the reach of Darwin. The cross-section for collider detection via vector boson fusion is estimated to be $\sim$ 1 fb, and may be ultimately attainable by the high-luminosity LHC; definitive collider identification will probably require the more powerful facilities now being proposed. This dark matter particle is compatible with a supersymmetric candidate in a multicomponent scenario.

[1] Reagan Thornberry, Maxwell Throm, John Killough, Dylan Blend, Michael Erickson, Brian Sun, Brett Bays, Gabe Frohaug, and Roland E. Allen, "Experimental signatures of a new dark matter WIMP", EPL (European Physics Letters), in press, arXiv:2104.11715 [hep-ph].

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