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**Relic abundance of a new dark matter WIMP annihilating to  $WW^*$  and  $ZZ^*$**  CADEN LAFONTAINE, TREVOR CROTEAU, BRANDON TORRES, BAILEY TALLMAN, DRUE LUBANSKI, SABRINA HERNANDEZ, SPENCER ELLIS, DIEGO CRISTANCHO GUERRERO, ROLAND ALLEN, Texas A&M University — We report calculations of the annihilation cross-section for the dark matter WIMP that we have proposed, here represented by  $H$ . For annihilation to real particles,  $WW$  and  $ZZ$ , we make the approximation that the  $W$ ,  $Z$ , and  $H$  masses are nearly equal ( $\sim 80$ - $100$  GeV.). We find that the total annihilation cross-section is more than an order of magnitude too large for  $m_Z > m_H > m_W$ , and about a factor of 2 larger still for  $m_H > m_Z$ . (Without this approximation, the cross-sections would be even larger.) For annihilation to one real particle and one virtual,  $WW^*$  and  $ZZ^*$ , we make the approximation of neglecting the masses of the fermions (which are all relatively small). If  $m_H$  is well below  $m_W$ , the total cross-section is more than an order of magnitude too small. As the  $H$  mass approaches  $m_W$  from below, however, there is resonant behavior involving the  $W$  propagator, and for a mass of  $\sim 75$  GeV the cross-section has the value corresponding to the observed relic abundance. This annihilation cross-section is consistent with the limits set by observation of gamma-ray emissions from dwarf spheroidal galaxies by Fermi-LAT, and with gamma-ray emissions from the galactic center that have been interpreted as possible evidence of dark matter annihilation.

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