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Capture and Decay of Electroweak WIMPonium

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The spectrum of Weakly-Interacting-Massive-Particle (WIMP) dark matter generically possesses bound states when the WIMP mass becomes sufficiently large relative to the mass of the electroweak gauge bosons. The presence of these bound states enhances the annihilation rate via resonances in the Sommerfeld enhancement, but they can also be produced directly with the emission of a low-energy photon. I will present a calculation of the rate for SU(2)-triplet dark matter (the wino) to bind into WIMPonium – which is possible via single-photon emission for wino masses above 5 TeV for relative velocity v < O(10ˆ{-2}) – and the subsequent decays of these bound states. I will also present results with applications beyond the wino case, e.g. for dark matter inhabiting a general nonabelian dark sector.

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