

Abstract Submitted
for the APR17 Meeting of
The American Physical Society

Zero-Range Effective Field Theory for Resonant Wino Dark Matter¹ EVAN JOHNSON, ERIC BRAATEN, HONG ZHANG, Ohio State University — The most dramatic “Sommerfeld enhancements” of neutral-wino-pair annihilation occur when the wino mass is tuned to near critical values where there is a zero-energy S-wave resonance at the neutral-wino-pair threshold. If the wino mass is larger than the critical value, the resonance is a wino-pair bound state. If the wino mass is near a critical value, low-energy winos can be described by a zero-range effective field theory in which the winos interact nonperturbatively through a contact interaction. The parameters of the zero-range effective field theory can be determined by matching wino scattering amplitudes calculated by solving the Schrödinger equation for a nonrelativistic effective field theory in which the winos interact nonperturbatively through a potential due to the exchange of weak gauge bosons. The power of the zero-range effective field theory is illustrated by calculating the rate for formation of the bound state in the collision of two neutral winos through the emission of two soft photons.

¹Supported in part by DOE grant DE-FG02-05ER15715

Evan Johnson
Ohio State University

Date submitted: 30 Sep 2016

Electronic form version 1.4