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## **Enhancement in wino dark matter annihilation through the radiative formation of bound states (20' + 5')**

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The first so-called “Sommerfeld enhancement” of neutral wino dark matter annihilation occurs when the wino mass is tuned so there is a charged wino pair bound state at the neutral wino pair threshold. For larger wino mass, the charged wino pair bound state can be formed by a radiative transition in which a pair of photons is emitted. The bound state production rate is calculated in an effective field theory framework in which the winos interact nonperturbatively through a contact interaction. The subsequent annihilation of the bound charged winos into Standard Model particles can significantly enhance the dark matter annihilation rate, increasing the prospects for indirect wino dark matter detection.

**Primary authors:** BRAATEN, Eric (Ohio State University); JOHNSON, Evan (The Ohio State University); ZHANG, Hong

**Presenter:** JOHNSON, Evan (The Ohio State University)

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