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Closing Supersymmetric Resonance Regions With Direct Detection Experiments

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In order for neutralino dark matter to avoid being overproduced in the early universe, these particles must annihilate (or coannihilate) rather efficiently. Neutralinos with sufficiently large couplings to annihilate at such high a rate (such as those resulting from gaugino-higgsino mixing, as in "well-tempered" or "focus point" scenarios), however, have become increasingly disfavored by the null results of XENON100 and other direct detection experiments. One of the few remaining ways that neutralinos could potentially evade such constraints is if they annihilate through a resonance, as can occur if twice the neutralino mass falls within about 10% of the mass of either the scalar Higgses, pseudoscalar Higgs, or Z bosons. If no signal is observed from upcoming direct detection experiments, the degree to which such a resonance must be tuned will increase significantly. This talk will quantify the degree to which such a resonance must be tuned in order to evade current and projected constraints from direct detection experiments.

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