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Christopher Kelso (U of North Florida): Directly detecting Isospin-Violating Dark Matter

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We consider the prospects for multiple dark matter direct detection experiments to determine if the interactions of a dark matter candidate are isospin-violating. We focus on theoretically well-motivated examples of isospin-violating dark matter (IVDM), including models in which dark matter interactions with nuclei are mediated by a dark photon, a Z , or a squark. We determine that the best prospects for distinguishing IVDM from the isospin-invariant scenario arise in the cases of dark photon- or Z -mediated interactions, and that the ideal experimental scenario would consist of large exposure xenon- and neon-based detectors. If such models currently just evade current direct detection limits, then one could distinguish such models from the standard isospin-invariant case with two detectors with of order 100 ton-year exposure.

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