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Direct Detection Constraints on a Magnetic Fluffy WIMP

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We explore a scenario in which Magnetic inelastic Dark Matter can scatter to a tower of heavier states. The splitting between successive states is assumed to be a constant $\delta \sim \mathcal{O}(\text{keV})$. Such a spectrum with small mass splittings can arise naturally in an extradimensional model with a large compactification radius. We find that a region of parameter space corresponding to $m_\chi \sim 14 \text{ GeV}$ and $\delta < 20 \text{ keV}$ is allowed by the constraints from XENON100, KIMS, CDMS, CRESST II and ZEPLIN III.

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