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DynHo: A New Trap For Dark Matter

We investigate a new method to search for keV-scale sterile neutrinos that could account for Dark Matter. Neutrinos trapped in our galaxy could be captured on stable 163Dy if their mass is greater than 2.83 keV. Two experimental realizations are studied, an integral counting of 163Ho atoms in dysprosium-rich ores and a real-time measurement of the emerging electron spectrum in a dysprosium-based detector. The capture rates are compared to the solar neutrino and radioactive backgrounds. An integral counting experiment using several kilograms of 163Dy could reach a sensitivity for the sterile-to-active mixing angle sin(theta)ˆ2 of 1e-5 significantly exceeding current laboratory limits. Smaller mixing angles may be explored with a real-time experiment.

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