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Are Dark Matter WIMP's of Mass 8.6 GeV Octoneutrons?

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Abstract

Recent experimental findings suggest that WIMP's at 8.6 GeV are boundstates of 8 neutrons.

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Dark matter WIMP's may have been detected recently by Cabrera's group at Stanford[1], with detector readings around 8.6 GeV. The detector readings showed a 3σ signal consistently during a 14-month run.

Meanwhile, Dudkin's group at Tomsk[2] have detected o*ctoneutrons* __ __ neutron clusters consisting of eight neutrons __ __ in the decay of 252Cf nuclei to the daughter nucleus U-232 (half-life of 68.9 years). Since a neutron contributes an average 1.07 GeV to heavier-element nuclei, octoneutrons should have a mass of about $8 \times (1.07 \text{ GeV}) = 8.56$ GeV. This suggests that Cabrera's WIMP's may be Dudkin's octoneutrons.

A perfect cubic configuration is the natural presumed structure for an octoneutron, with each neutron essentially abutting its 3 nearest neighbors. Each of the 8 neutrons resides at a vertex of a perfect cube, with gluonic exchange forces acting to produce strong binding of the neutrons. Such an ultra-tight bound structure would be extremely stable over the age of the Universe. Moreover, with gluonic exchange concentrated at the 8 vertices, the octoneutrons would be ultra-small in size and interact weakly with other matter. Hence, the octoneutron is an extremely logical WIMP candidate.

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References

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[2] G.N. Dudkin, *et al.*, "Arguments for Detecting Octaneutrons in Cluster Decay of 252Cf Nuclei", arXiv: 1306.4072; to appear in J. of Phys. G: Nuclear and Particle Physics.

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