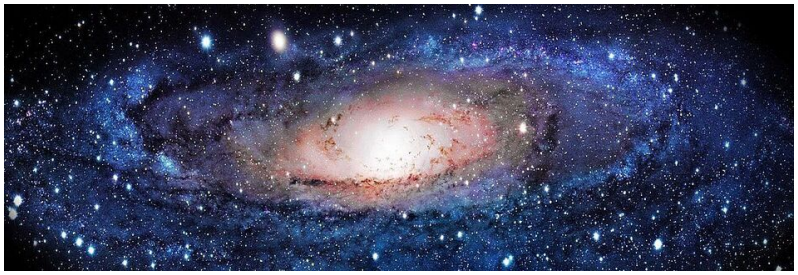

Contribution ID: **15** Type: **not specified**

A new perspective on some current mysteries, including dark matter, dark energy, and black hole entropy

Wednesday 21 September 2022 11:00 (30 minutes)

The many long-standing and still unresolved problems in fundamental physics suggest that a completely new perspective is needed. A new picture [1,2] leads to an action for quantum fields that contains the Standard Model embedded in a more complete theory, with SO(10) grand unification, supersymmetry (at some energy scale), and an extended Higgs sector. This last feature predicts a novel dark matter WIMP, with a mass of about 70 GeV and no interactions except second-order gauge couplings to W and Z bosons [3,4]. This particle should be observable within the next several years in dark matter direct-detection experiments (XENONnT, LZ, and PandaX), and in 12-15 years at the high-luminosity LHC, and it may already have been detected in the gamma rays observed by Fermi-LAT and antiprotons observed by AMS-02. In addition to the preceding quantitative predictions, the present theory has implications for other fundamental issues, such as the cosmological constant problem and the origin of black hole entropy.

[1] Roland E. Allen, "Predictions of a fundamental statistical picture", arXiv:1101.0586 [hep-th].
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[3] Reagan Thornberry, Maxwell Throm, Gabriel Frohaug, John Killough, Dylan Blend, Michael Erickson, Brian Sun, Brett Bays, and Roland E. Allen. "Experimental signatures of a new dark matter WIMP", EPL (Europhysics Letters) 134, 49001 (2021), arXiv:2104.11715 [hep-ph].
[4] Caden LaFontaine, Bailey Tallman, Spencer Ellis, Trevor Croteau, Brandon Torres, Sabrina Hernandez, Diego Cristancho Guerrero, Jessica Jaksik, Drue Lubanski, and Roland E. Allen, "A Dark Matter WIMP That Can Be Detected and Definitively Identified with Currently Planned Experiments", Universe 7, 270 (2021), arXiv:2107.14390 [hep-ph].

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