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A quantum of darkness: The quantum origins of dark matter

Understanding the nature and origin of dark matter remains one of the greatest challenges facing modern astronomy and cosmology. The leading theoretical paradigm, Lambda cold dark matter (LCDM), works well on the largest scales but encounters significant issues on the cluster scale and below, and additionally requires the existence of an as-yet-undiscovered particle. Quantum theory however, could solve the dark matter problem entirely, without the need for new particles or new physics, and without compromising the previous successes of LCDM. Quantum analysis of the interaction properties of baryonic particles in 'sloping' gravity wells shows that photon-particle cross sections can vary, depending on particle environment and that, in large deep-gravity wells, these cross sections can be much less than currently accepted values. This purely quantum phenomenon provides an effective and unassailable solution to the dark matter problem within the LCDM framework. Additionally, a primordial formation scenario potentially enables an "all-baryonic" Universe to be observationally compliant with primordial nucleosynthesis ratios, galaxy distributions and microwave anisotropy observations, the pillars of observation that have previously required the need for a new "dark" particle. In this talk I will discuss the quantum solution to the dark matter problem.

Biography

Allan D Ernest has completed his PhD from the University of New England in 1991, working on theoretical and experimental aspects of photon-particle interactions in weakly ionized gases. His early Post-doctoral work was concerned with the control of excited state densities in plasmas using highly-tuned laser irradiation. More recently, he has been working in the area of Gravitational Quantum Astrophysics, studying the quantum-predicted properties of low-mass particles in deep-gravitational wells. He is currently a Senior Lecturer in Physics at Charles Sturt University and has published more than 30 proceedings and journal articles.

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