J Astrophys Aerospace Technol 2017, 5:3 (Suppl)
DOI: 10.4172/2329-6542-C1-012

The darkness of cosmological baryons: an update on quantum dark matter

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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), assumes the existence of a weakly interacting particle. At the time of writing no such particle has been discovered. Additionally, LCDM numerical models give rise to tensions with astronomical observations on the cluster scale and below. It can be shown however that when the interaction rates of photons with isolated charged particles (such as baryons and electrons) are calculated using gravitational quantum theory applied to deep gravity wells, those rates (and consequently also baryon-photon oscillation processes) are predicted to be significantly reduced, depending on the nature of the particle wavefunction and its environment. This enables uncoalesced baryons and electrons to function as the weakly interacting entities of LCDM and solve some of its small-scale issues, thereby providing a solution to the dark matter problem within that paradigm. The now well-established experimental verification of gravitational quantum states and the subsequent prediction by gravitational quantum mechanics of reduced baryon cross sections in large, deep gravity wells, means that the dark matter problem could be entirely solved without the need for new particles or new physics and without compromising the previous successes of LCDM. In this talk, i will explain briefly how gravitational quantum mechanics automatically leads to baryonic darkness in deep gravity wells and provide an update on the status of quantum dark matter theory. I will include discussion of how dark baryonic halos might be produced in the early universe and form a skeletal framework for galaxy formation, a process which can potentially enable an all-baryonic universe to be compliant with current observations of light element ratios, galaxy distributions and microwave anisotropy.

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