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Ariel Zhitnitsky (University of British Columbia): Cosmological axion field and quark nugget dark matter model

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I overview the dark matter model offering a very natural explanation of two (naively unrelated) problems in cosmology: the observed relation $\Omega_{\text{DM}} \sim \Omega_{\text{visible}}$ and the observed asymmetry between matter and antimatter in the Universe, known as the “baryogenesis” problem. In this framework, both types of matter (dark and visible) have the same QCD origin, form at the same QCD epoch, and both proportional to one and the same dimensional parameter of the system, Λ_{QCD} , which explains how these two, naively distinct, problems could be intimately related, and could be solved simultaneously within the same framework. I specifically want to review two recent papers:

1. long standing puzzle on the solar extreme UV radiation and quark nugget dark matter (JCAP 1710 (2017) no.10, 050, arxiv 1707. 03400)
2. CP odd axion field and the formation of the dark matter nuggets (Phys.Rev. D96 (2017) no.6, 063514, arxiv 1702.04354)

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