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Formation of dark atoms

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New stable heavy particles with even negative charge X^{-2n} arise in several extensions of the Standard Model. The Thomson-like neutral bound states XHe called dark atoms are the dark matter candidates. However, at present there is no comprehensive description of their formation at early stages of the cosmological evolution. The process of the X^{-2n} excess generation depends significantly on a model, pending on the electroweak properties of X -particles. If these particles have nontrivial $SU(2)$ electroweak charges, such excess should be balanced with baryon asymmetry by sphaleron transitions. The successive development of the nucleosynthesis, modified by the presence of dark atoms, is determined by their nuclear interaction with the baryonic matter. We approach these open questions of dark atom cosmology in the present work.

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