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Two talks on axion-SU(2) inflation (Ira Wolfson, Leila Mirzagholi)

Tuesday, 23 June 2020 15:00 (1 hour)

Zoom meeting: https://cern.zoom.us/j/7930190483 (password: see email)

Format: 20 minutes talk + 10 min discussion + 20 minutes talk + 10 min discussion

Virtual Axion Institute: The discussion on both talks can be continued in Ira's and Leila's virtual guest offices.
https://mattermost.web.cern.ch/axions/channels/ira-wolfson
https://mattermost.web.cern.ch/axions/channels/leila-mirzagholi

Ira Wolfson: "Here be dragons": no-go areas in the axion-SU(2) chromo-natural model, and the spectator model solution
Abstract: The axion-SU(2) chromo-natural model, proposed in [1,2] presents an attractive phenomenological inflationary model. Unlike other such models it is more stable due to the SU(2)~SO(3) homomorphism, that in some cases allows the generation of 60 efolds or more. These models are interesting since they produce a distinct chiral tensor radiation signature, while also possibly explaining the matter-antimatter disparity in the early universe. Previous works [3,4] have probed part of its initial condition phase space, and shown a significant basin of attraction to an attractor solution. This brings up the question: How attractive is the isotropic attractor solution of axion-SU(2) inflation? We probe a previously unexplored part of the initial condition phase space and reveal regions where the system fails to converge on the attractor solution. We call this area the "no-go" area, and we study its characteristics. We continue to study a version of the axion-SU(2) model in which the axion and gauge sectors are demoted to spectator status. We show that while the basin of attraction to the attractor solution becomes larger with further dominance of the inflaton sector over the axion's and gauge fields', the "no-go" area persists albeit in a more contained fashion. The talk is based on I.W., Azadeh Maleknejad, and Eiichiro Komatsu, 2003.01617.

Leila Mirzagholi: Effects of gravitational Chern-Simons term during axion-SU(2) inflation
Abstract: I discuss the effect of the gravitational Chern-Simons term coupled to the axion field on the production and propagation of gravitational waves during inflation with the spectator axion-SU(2) sector. Both parity-violating terms RR-tilde and FF-tilde exist simultaneously and should be effectively considered on the same level in the theory. Using the existing bounds on the parameters of the spectator axion-SU(2) gauge field sector and choosing reasonable cut-off scales, we put constraints on the new free parameter in our model to remain in the ghost-free regime.

[1] A. Maleknejad and M. M. Sheikh-Jabbari, Phys. Lett. B 723 (2013) 224 [1102.1513].
[2] A. Maleknejad and M. M. Sheikh-Jabbari, Phys. Rev. D 84 (2011) 043515 [1102.1932].
[3] E. Dimastrogiovanni and M. Peloso, Phys. Rev. D 87 (2013) 103501 [1212.5184].
[4] P. Adshead, E. Martinec and M. Wyman, Phys. Rev. D 88 (2013) 021302 [1301.2598].

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