

Chern-Simons Inflation and Baryogenesis

Stephon Alexander, Antonino Marciano, David Spergel

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We propose a model of inflation where the Chern-Simons interaction and vector fields play a central role in generating an inflationary epoch. As a result, in accord with the APS mechanism, the Sakharov conditions for baryogenesis are self-consistently satisfied, and we calculate the net baryon asymmetry index in terms of the gauge configuration necessary for inflation, based on the chiral anomaly. Inflation begins with a large plasma density of interacting gauge fields and fermions, which interact through gravity and the Chern Simons term. The Chern-Simons term drives power from an initial white-noise spectrum of gauge fields into a narrow-band of superhorizon wave vectors. At the same time, the fermionic current and metric coupling amplifies the gauge field on superhorizon scales. This phase-correlation and amplification of the gauge field produces the correct conditions to maintain more than 60 e-folds of inflation. Eventually the gauge field dissipates by producing the observed baryon asymmetry $\frac{n_b}{s} \sim 10^{-10}$, through the chiral anomaly and inflation ends.

Comments: 13 pages, 0 figures, Appendix A and B added

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