

Cosmological Helical Hypermagnetic Fields and Baryogenesis

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I will show that the baryon asymmetry of the Universe (BAU) is generated from the hypermagnetic helicity decay without being washed out by the sphalerons. Moreover such hypermagnetic fields still remain until today as the intergalactic magnetic fields, which will be the smoking gun of the scenario. I will also discuss a possible mechanism to generate such hypermagnetic fields. That is, the chiral instability induced by a large chiral asymmetry in the early Universe thermal plasma, which can be generated by the SU(5) GUT baryogenesis. Although the SU(5) GUT baryogenesis has been thought not to be a viable model for the BAU since the asymmetry is washed out by the sphalerons, it can be indirectly responsible for the BAU through the maximally helical hypermagnetic field generation.

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