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Cosmology with a Helical Flavor

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Whether the parity of the Universe is broken on the large scale is an ongoing question. If this is the case, then one may trace the origin of parity violation back to the inflationary era. In this talk, I will review a few mechanisms that lead to the generation of helical fields, a source of breaking the parity on the large scale. The presence of helical U(1) fields in the early Universe can explain the baryon asymmetry of the Universe. In fact, there is a connection between the baryon number and topology of the relic magnetic part of the U(1) field. Both the magnitude and sign of magnetic helicity can be detected in future diffuse gamma ray data. This will be a smoking gun for a link between inflation, parity violating fields, and the baryon asymmetry of the Universe.

E-mail

manber@lclark.edu

Primary author: Dr ANBER, Mohamed (Lewis & Clark College)

Presenter: Dr ANBER, Mohamed (Lewis & Clark College)

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