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Gauge Fields in the Early Universe and their remnants in the Sky

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Gauge fields and fermions are the building blocks of particle physics models. I will summarize some progress in understanding their production and contribution to the physics of cosmic inflation. In particular, I will focus on the case of non-Abelian gauge fields in axion inflation and discuss their rich phenomenology as well as their observable signatures on CMB and GW background. In these models Parity and CP are spontaneously broken in inflation which makes them natural settings for matter asymmetry. Finally, I will present a possible realization of this setup based on embedding axion-inflation in Left-Right symmetric extensions of the SM. In this model, a pure quantum effect, i.e. the chiral anomaly of the SU(2)_R gauge field, provides a common origin for baryogenesis and Right-handed neutrino production.

Presenter: MALEKNEJAD, Azadeh