

## Statistical Mechanics of the Universe

*Wednesday 1 May 2024 11:30 (1 hour)*

To start with I summarize some key puzzles of cosmology to be clarified in the future. I then briefly sketch how to describe the geometry and the state of matter in the Universe after its inflationary era. The main part of my talk is devoted to describing possible mechanisms for the generation of primordial magnetic fields in the Universe. These mechanisms are based on the chiral magnetic effect and a generalization thereof involving an axion. Time permitting I sketch ideas of how to explain the accelerated expansion of the Universe and the Matter-Antimatter Asymmetry.

Literature:

Papers with A. Alekseev and V. Cheianov (chiral magnetic effect, 1D quantum wires, particle jets from rotating stars) (90's)

Paper with B. Pedrini (1999) (anomalies, chiral magnetic effect, axions, generation of magnetic fields)

Papers with A. Boyarsky and O. Ruchayskii (anomalies, chiral magnetic effect, axions, generation of magnetic fields)

(Papers with R. Brandenberger et al., Dark Matter & Dark Energy)

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