



Contribution ID: 18

Type: poster

## Linear perturbations of an anisotropic Bianchi I model with a uniform magnetic field

*Wednesday, 20 February 2019 18:09 (1 minute)*

In this work, we study the effect of a magnetic field on the growth of cosmological perturbations. We develop a mathematical consistent treatment in which a perfect fluid and a uniform magnetic field evolve together in a Bianchi I universe. We then study the energy density perturbations on this background with particular emphasis on the effect of the background magnetic field. We develop a solution in the Newtonian treatment with adiabatic sound speed in the isotropic limit. We also find the full relativistic anisotropic solution for perturbations in the directions parallel and perpendicular to the background magnetic field when the sound speed is zero. This represents a new result in GR since all the present studies deal with isotropic systems: our solutions show a clear anisotropic behaviour and are far more complicated than the FRW ones. We also write an equation for the general solution of the problem which could be numerically integrated.

### Summary

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**Session Classification:** Poster session

**Track Classification:** General Relativity and Cosmology