

## Evolution of magnetic fields in cosmic string wakes.

*Tuesday, 13 June 2023 15:00 (20 minutes)*

We study the evolution of magnetic fields in cosmic string wakes in a plasma with a low resistivity. The initial magnetic field in the wake is modelled on the magnetic fields that are generated by the motion of particles around cosmic strings. The plasma is characterized by a high beta value. We find multiple shock like structures developing in the wake of the string. We study the detailed structure of the shocks formed and the evolution of the magnetic field in the shock using a 2-D magnetohydrodynamic simulation. As expected, the development of the magnetic field does not depend on the  $\beta$  value. Our results show that instead of a single uniform shock forming behind the cosmic string we have multiple shocks forming at short time intervals behind the string. The presence of multiple shocks will definitely affect the observational signatures of cosmic string wakes as these signatures depend upon the temperature fluctuations generated by the shock. We also find that as the shock moves away, the residual magnetic field left behind reconnects and dissipates rapidly. The magnetic field around the string is thus very localized. We find that magnetic field reconnections take place in cosmic string wakes. This leads to the decrease of the magnetic field in the post shock region.

### Secondary category for the parallel session (optional)

Cosmology

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