

Generation of magnetic fields in cosmic string wakes

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We describe a novel method of generating magnetic fields in cosmic string wakes from neutrino currents. We show that neutrino currents act as a cross-perturbation across the cosmic string wake. This cross perturbation along with the high Reynolds number generates a magnetic field in the wake of the cosmic string. The neutrino current is generated by the neutrinos rotating around the Abelian Higgs strings. As the string moves through the cosmic plasma, the velocity kick generated by the motion of the string will enhance the neutrino current in the wake region. The neutrino current density depends on its distance from the string and is oscillatory in nature. This leads to neutrino density gradients in the plasma. We have shown that these neutrino gradients give rise to electron gradients in the plasma, which in turn generate magnetic fields of the order of 10^{13} Gauss.

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Primary author: SAU, Sovan (University of Hyderabad)

Co-author: Dr SANYAL, Soma (University of Hyderabad)

Presenter: SAU, Sovan (University of Hyderabad)

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