

Contributed Talk

Splinter Non-Thermal

MAGNETIC FIELDS IN GALAXY CLUSTERS AND BEYOND

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In galaxy clusters, non-thermal components such as magnetic field, turbulence and high energy particles keep a record of the processes acting since early times till now. These components play key roles by controlling transport processes inside the cluster atmosphere and therefore have to be understood in detail. However including them in cosmological simulations is extremely challenging as the structures in and around clusters are quite complex and span a very large dynamic range in scales. I will report the status of what can be achieved in numerical simulations of the formation of galaxies and galaxy clusters in cosmological context and our predictions for the magnetic field structure based on models of magnetic seeding directly coupled to the star-formation process. This allows to model the transport of heat coupled directly to the magnetic fields in galaxy clusters as well as the modeling of cosmic ray electrons powering the diffuse radio emission within galaxy clusters.