

## Cosmic Magnetism in Voids and Filaments



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# Simulating the origin and evolution of Magnetic Fields in large scale structures: Numerical challenges and the interplay with Turbulence and CRs (review)

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Cosmological structures form in a hierarchical way. Transport of potential energy from the large scale to small scale motions ("turbulence") as well as injecting large amount of energy from small scales to larger scales by astrophysical progresses ("star-formation", "AGN") leads to a very complex and violent state of the diffuse, baryonic material within large scale cosmological structures. The computational treatment of the combination of all these processes is very challenging under numerical aspects, as well as challenge our physical understanding of many fundamental processes in galaxy formation. I will try to give an overview how our (sometimes missing) understanding of these processes are still limiting our predictive power for forecasting magnetic field origin and evolution within large scale structures.

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