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Merging galaxy clusters in radio surveys

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The intra-cluster medium accounts for most of the baryon mass in galaxy clusters. However, its dynamical processes, magnetic fields properties, and cosmic ray content are still poorly constrained. Diffuse synchrotron emission in galaxy clusters provides a probe for all of these three components.

Radio relics are synchrotron emission sites found in downstream regions of galaxy cluster merger shocks. While they are often confirmed through targeted X-ray and radio observations their signature is also present in large surveys. Several models for the origin of radio relics have been proposed.

Through Bayesian statistics one can infer the posterior likelihood of competing models given the data and prior information. Approximate Bayesian Computation (ABC) is an approach to estimate the posterior likelihood if the complexity of the data is high.

We use ABC to investigate diffusive shock acceleration models with and without pre-existing relativistic electrons based on the NVSS survey and cosmological simulations. I present what we can infer from our current data pool and which surveys we need to strengthen the model inference capabilities of our ABC approach.

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