

Re-lighting the fire in galaxy groups: the case of Hickson Compact Group (HCG) 15

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While merging massive galaxy clusters are among some of the most spectacular events in the Universe, the majority of galaxies reside not in these behemoths, but in smaller structures such as poor clusters and galaxy groups. In these lower-mass environments, phenomena related to active galactic nuclei (AGN) and member galaxies play a more significant role in the enrichment and evolution of the intra-group medium (IGrM) and its associated magnetic field. However, despite the importance of studying magnetic fields in these environments, they remain largely under-explored.

Compact groups in particular represent a golden opportunity to study the effects of feedback and interactions on the IGM. These dense structures display a particular wealth of interaction-driven phenomena, from morphological peculiarities and disturbances, to AGN activity and starbursts, to shocks and group-scale outflows.

Hickson Compact Group 15 (HCG15) represents an especially unusual and enigmatic galaxy group. Dominated not by a single giant elliptical galaxy but rather six galaxies with a mixed elliptical/lenticular population, it is known to host extended thermal X-ray emission and diffuse intergalactic light but is highly deficient in neutral gas, and it also hosts an unusual diffuse radio source that has eluded classification until now.

New ASKAP observations from the EMU survey revealed that this diffuse emission is strongly polarised with a highly-ordered magnetic field, kickstarting a multi-wavelength follow-up campaign with LOFAR, the GMRT, the JVLA, and MeerKAT at S-band. In this talk, I will present the results of this campaign with a particular focus on our deep full-polarisation ASKAP and MeerKAT results. Our study sheds new light on the system, revealing the spectropolarimetric and thermal/non-thermal properties as well as the topography of the magnetoionic medium in unprecedented detail, finally allowing us to solve the mystery of HCG15's nature.

keywords

Galaxy groups, AGN, polarisation

In-person or online?

in-person

Career level

ECR

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