Radio-dim and bright regions in cluster spiral galaxies

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Résumé

One of the tightest correlations in astronomy is the relation between the integrated radio continuum (synchrotron) and the FIR emission. It holds over five orders of magnitude in various types of galaxies including starbursts. The common interpretation of the correlation is that both emission types are proportional to star formation. Radio continuum emission can act as a tracer for the star formation rate with the added advantage over other tracers that it is unaffected by dust attenuation.
The relation between the resolved star formation rate per unit area and the nonthermal radio continuum emission was studied in 21 Virgo cluster galaxies and the two nearby spiral galaxies, NGC 6946 and M 51. Based on the linear correlation between the SFR per unit area and the synchrotron emission and its scatter, radio-bright and radio-dim regions can be robustly defined for our sample of spiral galaxies. For the interpretation and understanding of our results, we used a 3D model where star formation, 2D cosmic-ray propagation, and the physics of synchrotron emission are included.
I will discuss the physical causes of radio-dim and bright regions and relate them to the interaction of the galaxy with the cluster environment.

Mots-Clés: cluster spiral galaxies, radio continuum emission

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