

Plenary Talk

THE ROLE OF MAGNETISM IN SPIRAL GALAXIES - RECENT PROGRESS WITH LOFAR, VLA, AND EFFELSBURG

Rainer Beck¹

¹*Max-Planck-Institut für Radioastronomie, Bonn*

Galactic magnetic fields are strongest in spiral arms and bars. They are dynamically important, affect gas flows and probably the evolution of galaxies.

Recent improvements in processing LOFAR data provide deep low-frequency images of galaxies that are interpreted as the illumination of magnetic fields by diffusing cosmic-ray electrons. Combined VLA and Effelsberg radio polarization observations show that ordered fields are generally concentrated in interarm regions. Distinct “magnetic arms” between the gaseous spiral arms are observed preferably in galaxies where a stable spiral pattern and a large-scale dynamo could develop.

Faraday rotation data in almost face-on galaxies reveal vertical fields; Parker-type field loops are found in some regions. For a large sample of edge-on galaxies, the CHANG-ES project with the VLA aims at measurements of the structures and scale heights of magnetic halos and the speed of galactic winds.