

Talk at Splinter Meeting

Splinter B

THE MAGNETIC FIELD OF THE MAGELLANIC TYPE SPIRAL GALAXY
NGC 3432

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We have applied the novel technique of rotation measure synthesis to galaxies observed recently within the "Continuum HALos in Nearby Galaxies - an Evla Survey" (CHANG-ES) project. This technique allows us to overcome the depolarising effect of Faraday rotation, in which ionised media along the line of sight rotate the linear polarisation angle of radiation passing through. The CHANG-ES project observed 35 edge-on galaxies with the Karl G. Jansky Very Large Array over the last couple of years in three different array configurations (B,C,D) and two different frequency bands (C,L). In this work we focus on the edge-on spiral galaxy NGC 3432, a Magellanic type spiral galaxy. Rotation measure synthesis yields maps showing the total polarization intensity, the polarisation angle, and a rotation measure map corrected for galactic foreground Faraday rotation. One striking result is the detection of a clear X-shaped magnetic field, seen in many edge-on galaxies, which also extends well into the halo of the galaxy. Furthermore, plane parallel field components are seen in the faint, diffuse outer parts of the optical galaxy. These faint extensions would either be the result of a minor merger or due to a close flyby of a neighbouring galaxy. Within NGC 3432 the plane of the galaxy seems to be completely depolarised, which might be an effect of the superposition of a plane parallel field and an X-shaped magnetic field or beam depolarisation due to insufficient angular resolution. The analysis of the rotation measure distribution in combination with kinematic HI data allows us to determine that the plane parallel field seen might be an outward spiral field, which is not often found in edge-on galaxies. A rough estimate of the total magnetic field strength, assuming equipartition, yields a field strength between 10 and 16 μG , which is stronger than for example the magnetic field in the LMC.