

# Large-scale diffuse polarized emission in the galaxy cluster Abell 523

## Abstract

Large-scale diffuse emission in the form of radio halos is to date well known to inhabit a fraction of merging galaxy clusters. Despite being of paramount importance for the study of the cluster magnetization, a polarized signal has been observed with high significance only in three of these sources. In previous work being prepared for publication we find evidence of polarized emission in the radio halo in A523 at 1.4 GHz on scales of about 2.5 Mpc. This is the first time that a polarized signal is observed in the direction of a galaxy cluster on scales larger than 1 Mpc. The total intensity counterpart could be only detected in the very central region of the system, likely due to the confusion noise issues. With the present proposal, we ask for mosaic polarimetric observations of A523 in the frequency range 900–1670 MHz in order to assess the real extension of the polarized emission, understand the interplay between intracluster magnetic field and relativistic electrons responsible of the observed diffuse emission, and look for total intensity on a similar spatial scale missed by previous observations.