

A CCD POLARIMETER WITH FOCAL REDUCER

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ABSTRACT. At the Landessternwarte a new CCD polarimeter was constructed to observe magnetic fields (Davis-Greenstein) of nearby galaxies. This program is performed in collaboration with the MPI für Radioastronomie Bonn. By means of a focal reducer, the instrument records a field of 14.4 x 9.6 arcminutes at the 1.23-m telescope of the MPI für Astronomie on Calar Alto. Hence galaxies with large angular diameter, which have already been observed with the 100-m radio telescope Effelsberg, can be observed.

1. Principle of operation

An achromatic half-wave plate (Pancharatnam type) is rotated in front of a sheet polarizer in steps of 22.5°. Thus 16 images are recorded for one measurement. To avoid instrumental polarization in the focal reducer, the polarization optics is placed in front of it. The instrumental polarization of the telescope and the possible atmospheric transmission variation as well as the variation of the seeing disc from one image to another are corrected by means of foreground stars. The same foreground stars are used to correct possible displacements between the images caused by bending effects and/or a wedge-shaped half-wave plate. After the subtraction of the sometimes highly polarized sky background, polarization is evaluated by Fourier analysis (see Neininger et al., this volume).

2. The focal reducer

The focal reducer consists of a collimator and a camera. The collimator is built as an Erfle eyepiece with 3 achromats, and the camera is a Pentax objective. The characteristic parameters are given by:

reducing factor	3.43
focal ratio	1/2.33
focal length of the collimator	171.5 mm
focal length of the camera	50.0 mm
resolving power at the 1.23-m telescope	3".1 (2 pixels)