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Physikalische Institute Köln

Lecture Hall III

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## Crosscorrelation Statistics and Modelling the Spectral Properties of ISM

The inverse problem of the detection of the helical properties of a turbulent magnetic field using integral observation statistics is discussed. A principal solution that sets the relation between the values of magnetic helicity and the level of correlation between the Faraday rotation measure and the polarization degree of radio synchrotron emission has been presented. The effect of depolarization plays the main role in this problem and allows for the detection of magnetic helicity for a certain frequency range of observable radio emissions. The proposed method is mainly sensitive to the large-scale magnetic field component.

**Fig. 1.** Radio maps. Distributions are presented in the observation plane  $(x, y)$ :

(a) Faraday rotation measure distribution  $RM(x, y, z = L)$ ,

(b) polarization degree  $p$  for  $\lambda = 0.05$  m, and

(c) for  $\lambda = 0.2$  m.

The image resolution is  $256 \times 256$  pixels. The black color corresponds to minimum values and white corresponds to maximum values.

