Full Stokes spectropolarimetry of solar type stars and multiline Zeeman Doppler Imaging (ZDI) based on Principal Component Analysis.

Meir Semel
(LESIA, Observatoire de Paris)

After summarizing the first approach of ZDI with circular polarization and the simple assumption of the Stokes V proportional to the derivative of the intensity profile, we describe the next steps of ZDI.

We calculate the Stokes vector of spectral lines formed in presence of magnetic field.

Several models of atmosphere corresponding to solar type stars are used. Magnetic fields in the range of 0 to 3000 gauss, in different orientations and at different positions on the star surface are considered in computing all spectral lines in the range of 4000 to 7000 Angstroms.

Compressing the data is achieved with the technique of Principal Component analysis.

This mathematical approach indicates new methods of detection of the polarized profiles due to Zeeman effect.