

HMI Monthly Report for December 2007

Efforts to speed up the code for the vector magnetic field continue. The Fortran 90 interpolation scheme for the Voigt function turns out not to be any faster than the old calculation. However, the Taylor expansion is twice as fast. After we have implemented this new method we expect to gain about 5-10 % speed for the total inversion (initially we had hoped to improve the performance much more than this). In addition we have implemented a number of "tweaks", suggested by Jesper during his visit to HAO in November, to avoid needless evaluations of the derivatives and the Hessian matrix. These alone have improved the speed of the inversion code by about 10 %.

We are also focusing in improving the convergence of the code, smoothness of the solutions etc. To that end, we will gather a large number of observations taken with Hinode's spectropolarimeter: active regions and quiet sun observed at different heliocentric angles. Our purpose is to apply the inversion code to these observations to evaluate how well the code will perform with HMI full disk data, especially close to the limb.

Also, we want to use this data to decide if we will set up a "polarization detection threshold", below which we will not invert the data. Additionally, this will help us to decide whether we will give values for the actual magnetic field strength or for the magnetic flux.

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