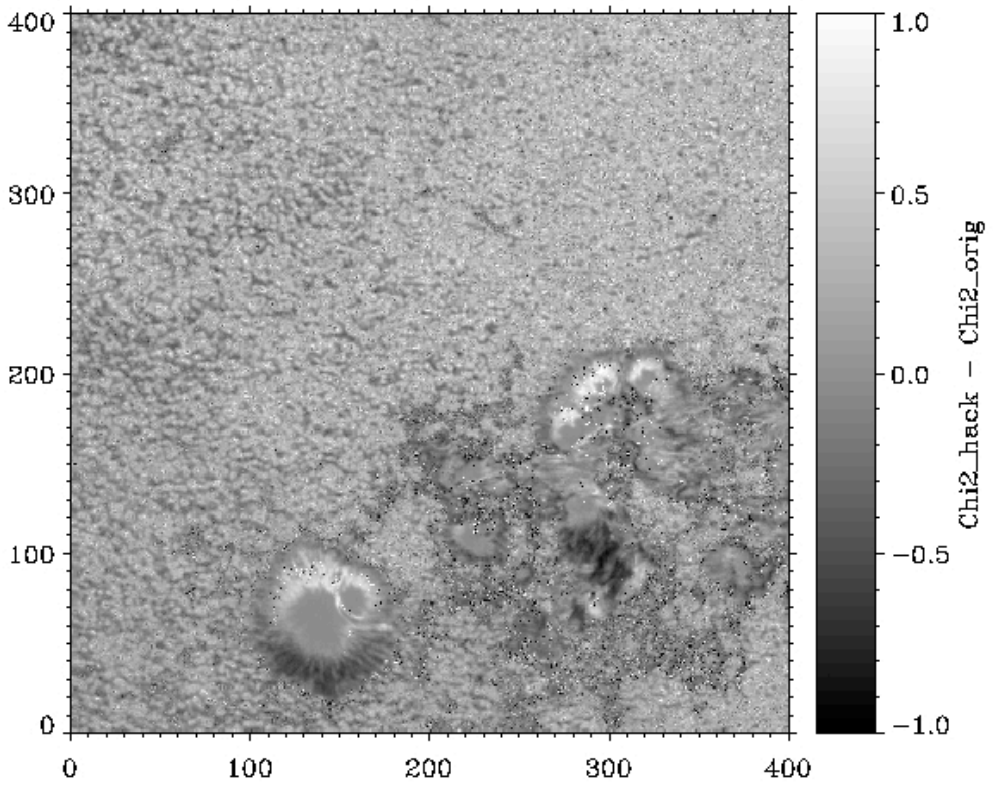
April 15, 2011

Filter coverage hack

Keiji helped me hack the code to account for the filter contribution outside of the spectral region of the forward modeling.
The idea is, basically, to synthesize the Stokes profiles in a given spectral region around the spectral line, and then account for the contribution in an outer region by integrating the filters in this outer part and multiply them by the continuum intensity. This way we avoid doing the forward modeling in the full spectral region that we need to synthesize.

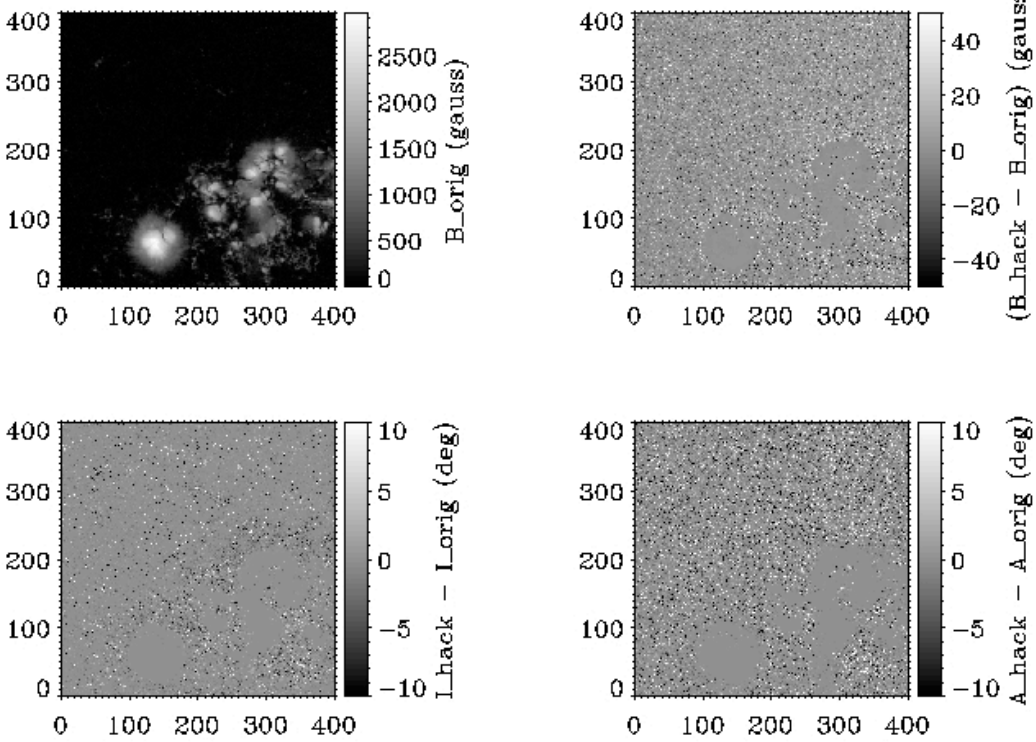
The test was done for the case of a full spectral region of +/-2 A. Two runs:
- one with the forward modeling for the full spectral region (149 spectral points)
- a second one where the forward modeling was done only inside 1/3 of the full region (49 spectral points), while the rest was assumed to be continuum, and only the filters - but no spectral line- were accounted for (the remaining 100 spectral points).

I inverted a region around disk center of the March 9, 2011 dataset and plotted the differences in the results obtained by both methods.
The following figure shows the difference between the chi2 with both methods:



The average chi2 for the “hacked” method is 2.87, while for the “original” method it’s 2.74.

Difference in magnetic parameters (field-of-view; B, inclination and azimuth differences):



Difference in thermodynamical parameters (shown as percentages of total values):