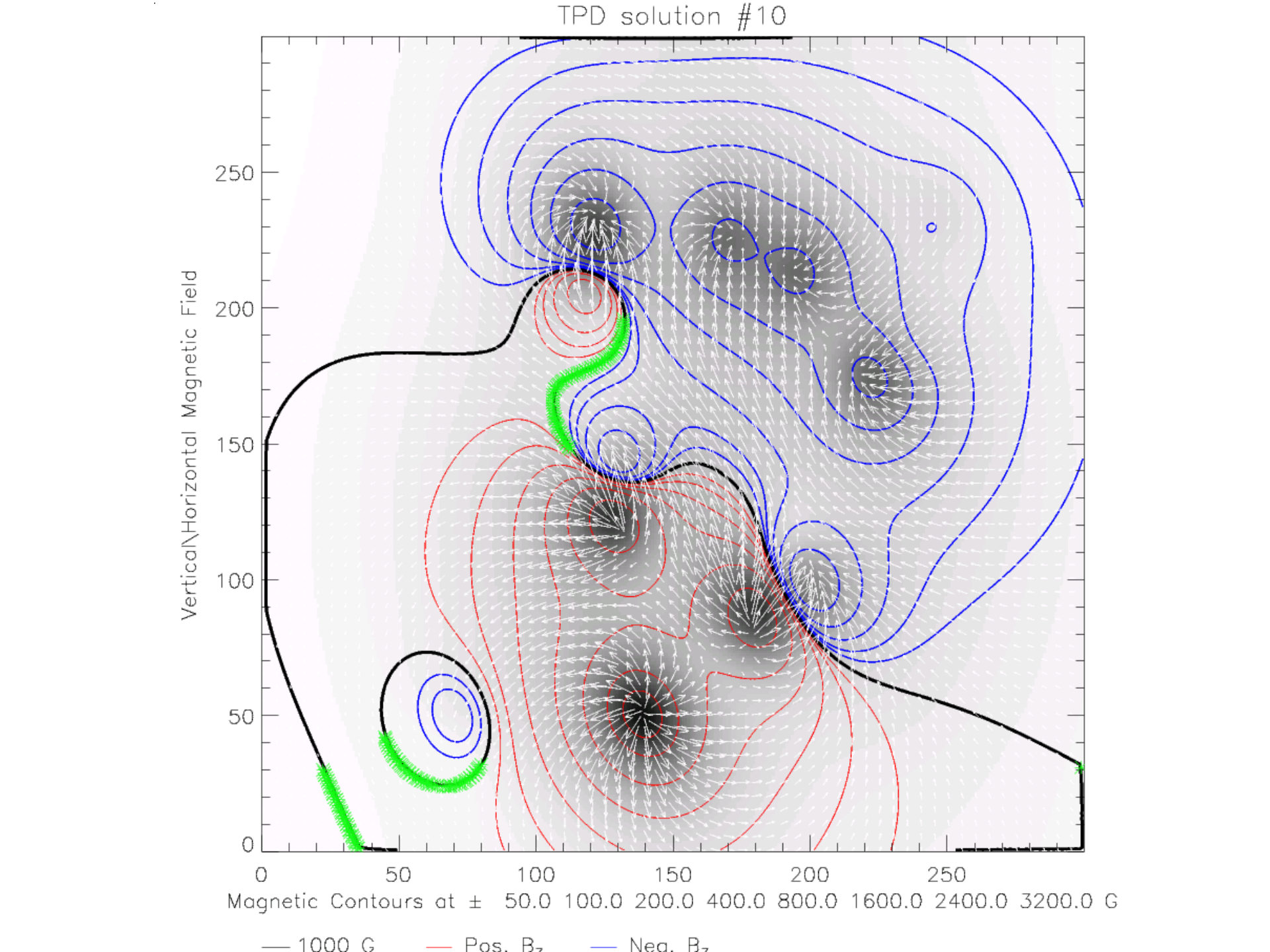
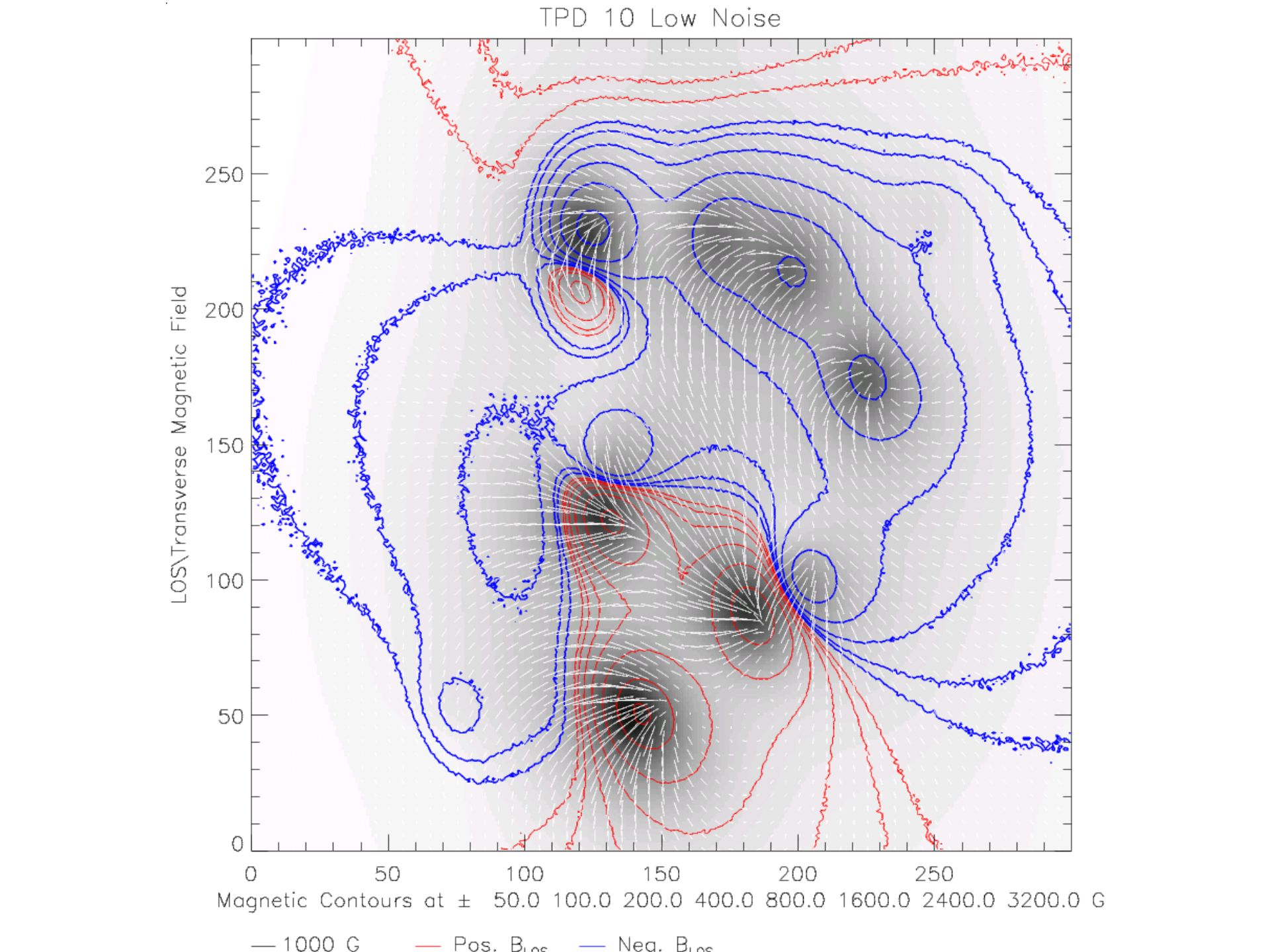
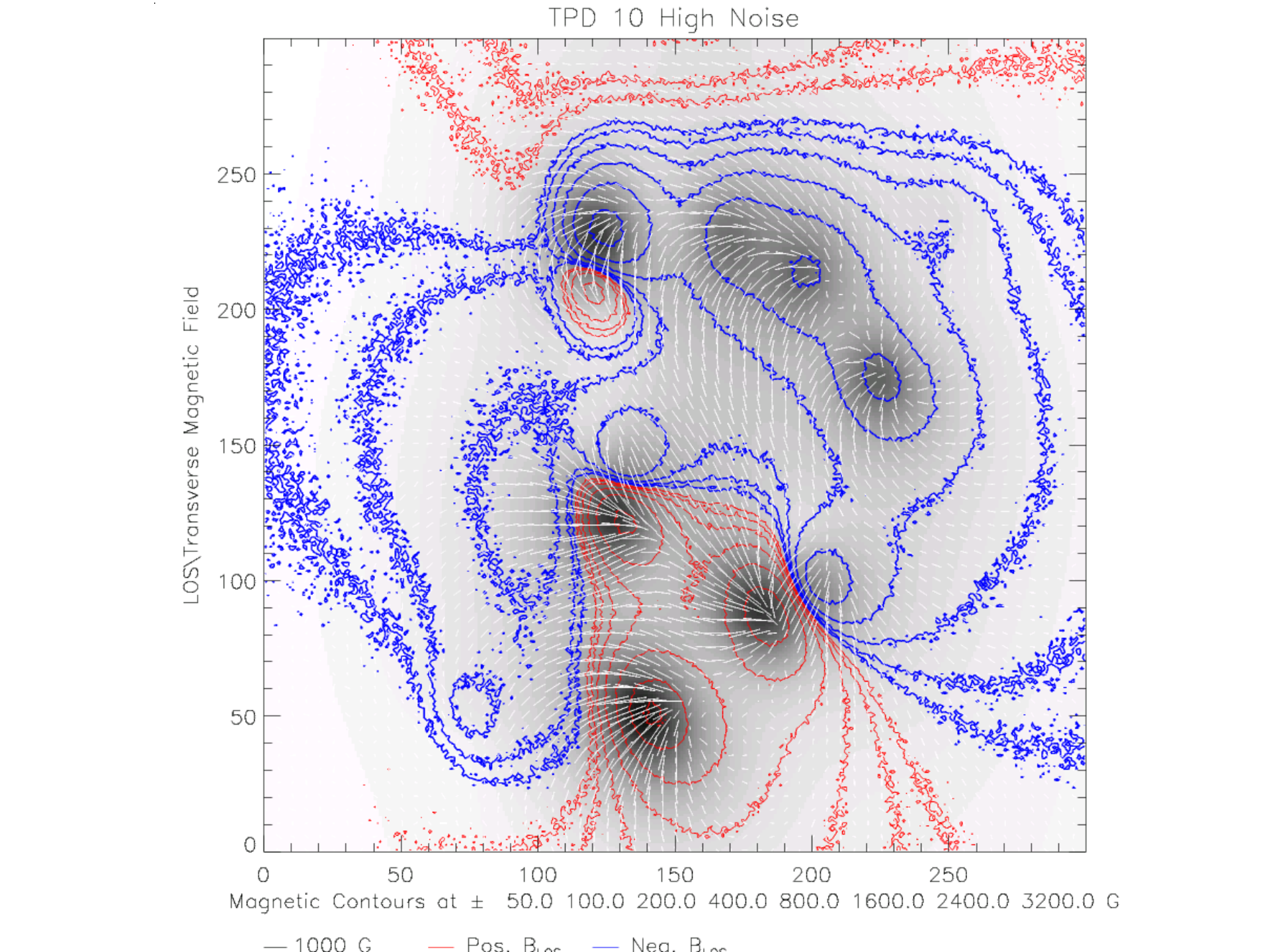

TPD solution #10
Vertical\Horizontal Magnetic Field
0
50
100
150
200
250
Magnetic Contours at ± 50.0 100.0 200.0 400.0 800.0 1600.0 2400.0 3200.0 G
1000 G
Pos. B_z
Neg. B_z

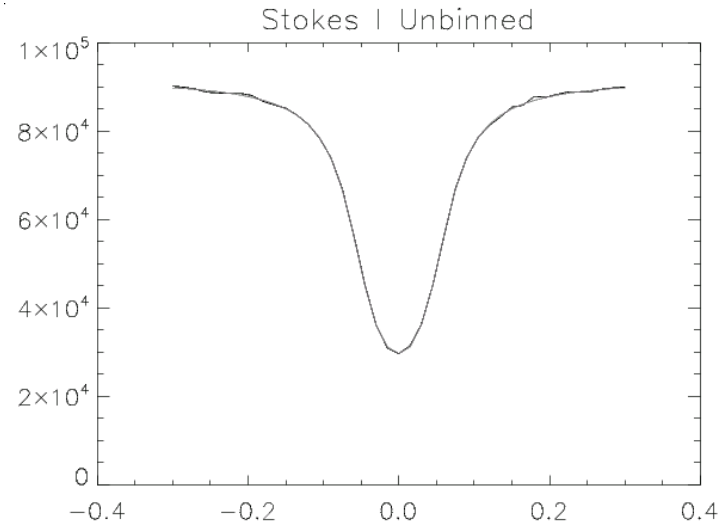
Adding Noise to the Model Magnetograms

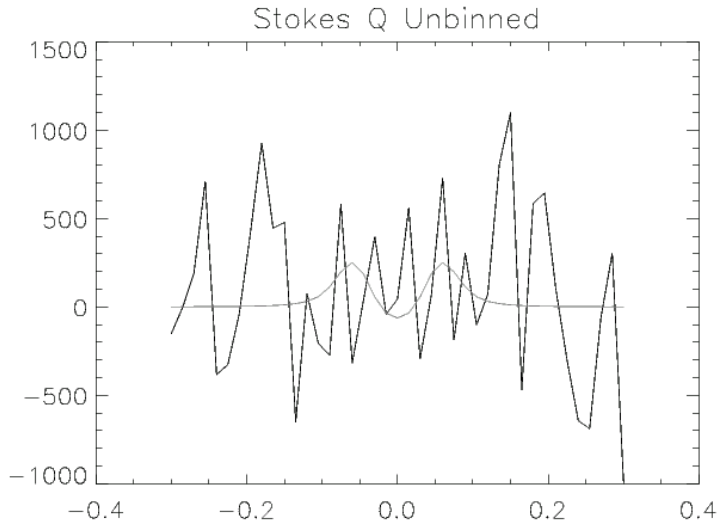
- Noise was added to the model magnetograms via several steps:
  - At each pixel, the model field was used to generate ideal Unno-Rachkovsky Stokes profiles (Milne-Eddington).
    - Used parameters typical for the 6302.5 line. (Doppler width 30 mA, g_{lande}=2.5, etc.)
  - The Stokes profile was convolved with an assumed instrument spectral response (30 mA).
  - Poisson noise was added to the ideal Stokes profiles.
    - The continuum was varied from "quiet sun" to "sunspot" so the Stokes profiles in the dark sunspots have smaller S/N than in the bright quiet sun. I_c=1-0.9B/B_{max}
    - The core of the line is also darker and has smaller S/N.
  - The noisy profile was inverted to give a noisy vector field.

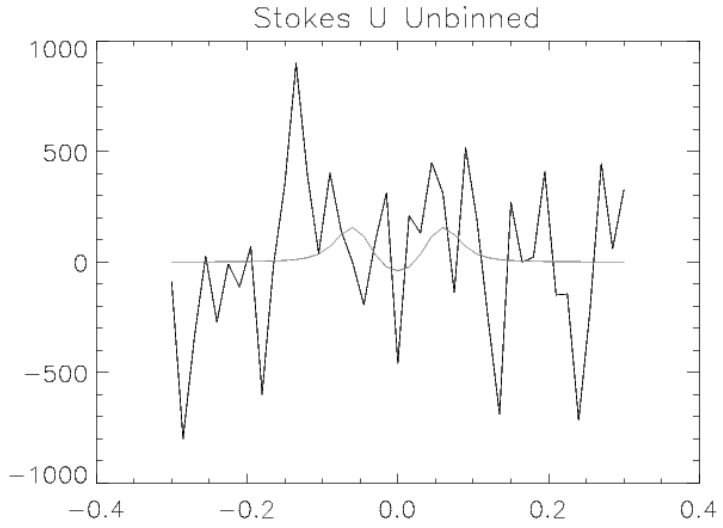

TPD 10 Low Noise
LOS\Transverse Magnetic Field
0
50
100
150
200
250
Magnetic Contours at ± 50.0 100.0 200.0 400.0 800.0 1600.0 2400.0 3200.0 G
1000 G
Pos. B
Neg. B

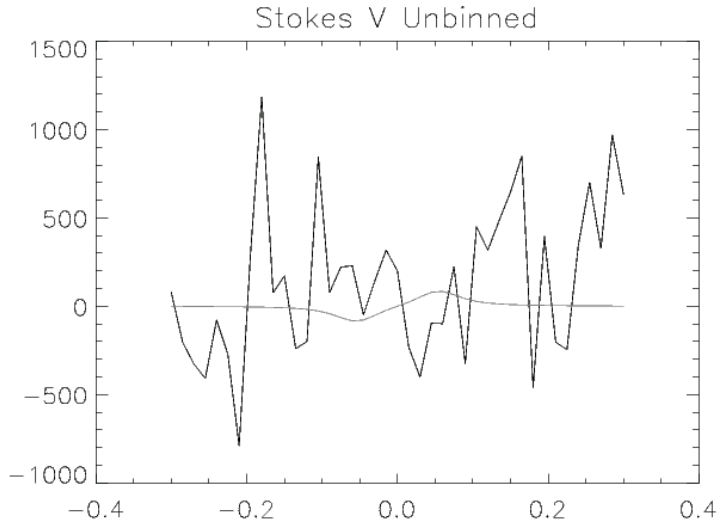

TPD 10 High Noise
LOS\Transverse Magnetic Field
0
50
100
150
200
250
Magnetic Contours at ± 50.0 100.0 200.0 400.0 800.0 1600.0 2400.0 3200.0 G
1000 G
Pos. B_LOS
Neg. B_LOS

TPD10, Low Noise, Quiet Sun

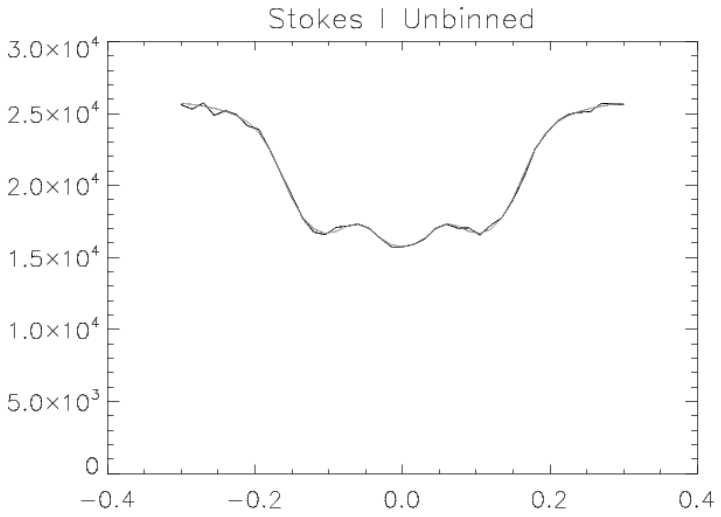


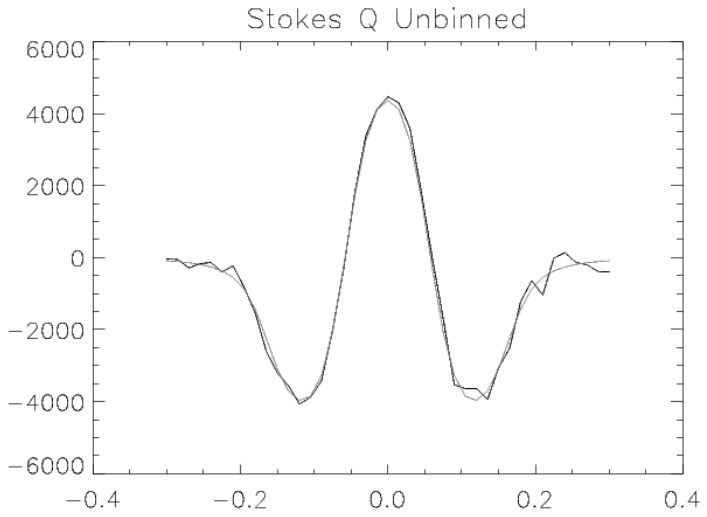


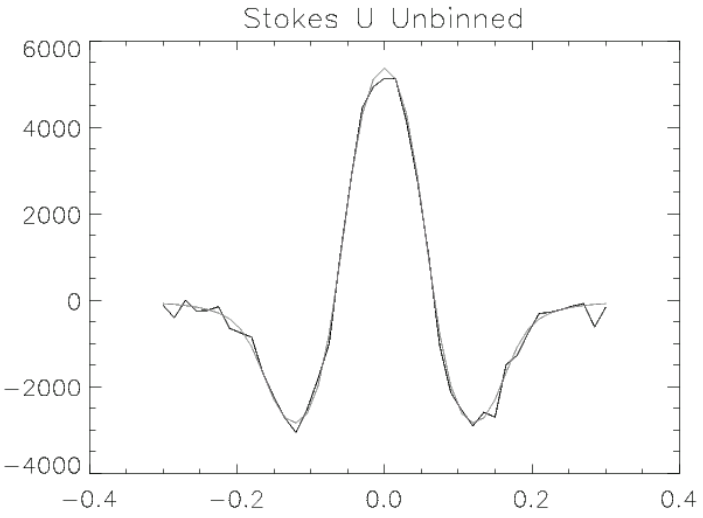


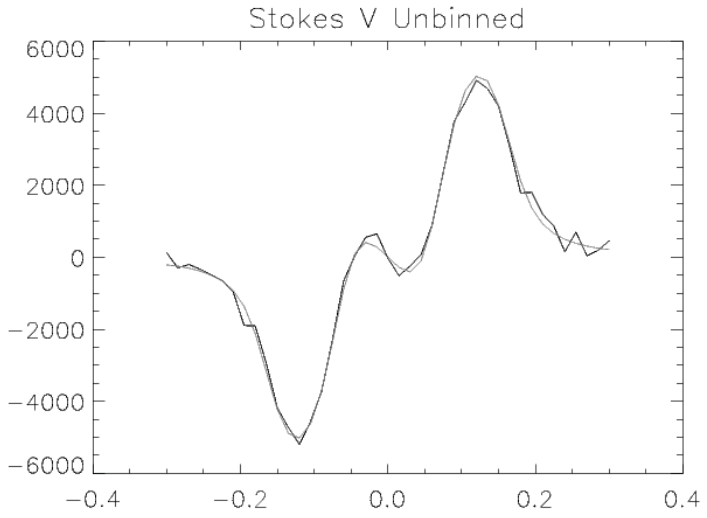


TPD10, Low Noise, Sunspot

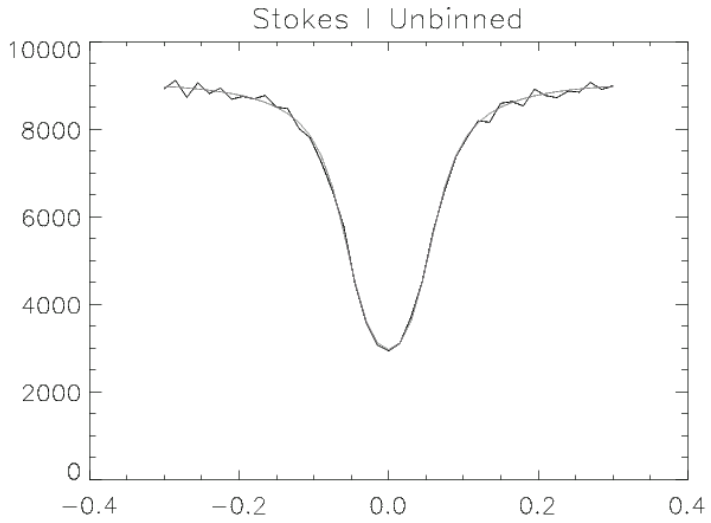


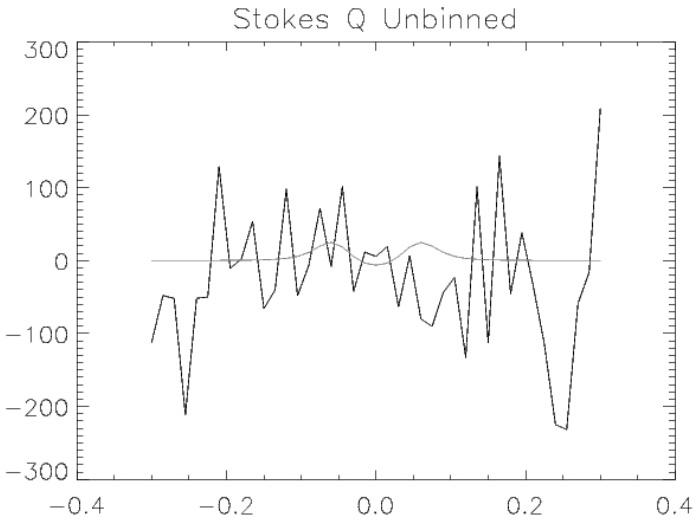


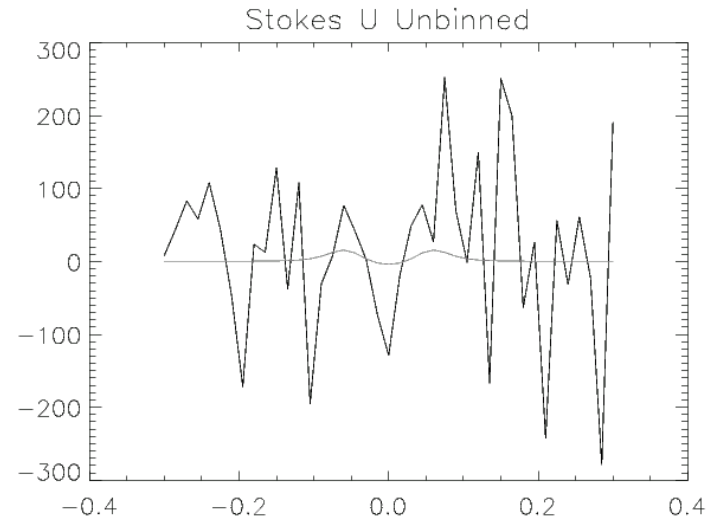


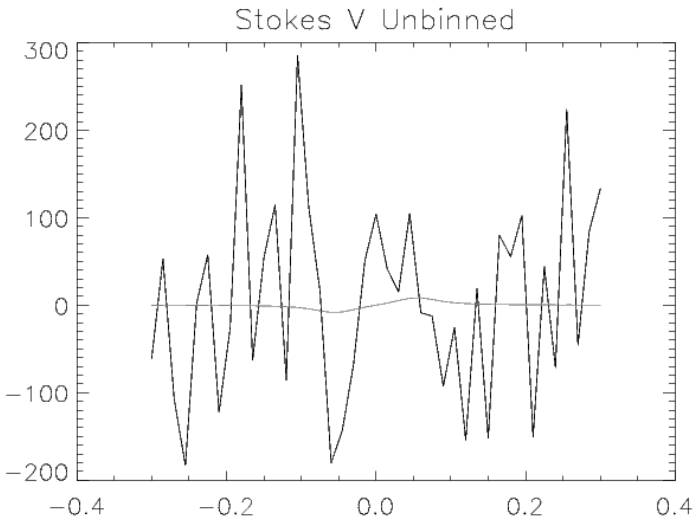


TPD10, High Noise, Quiet Sun

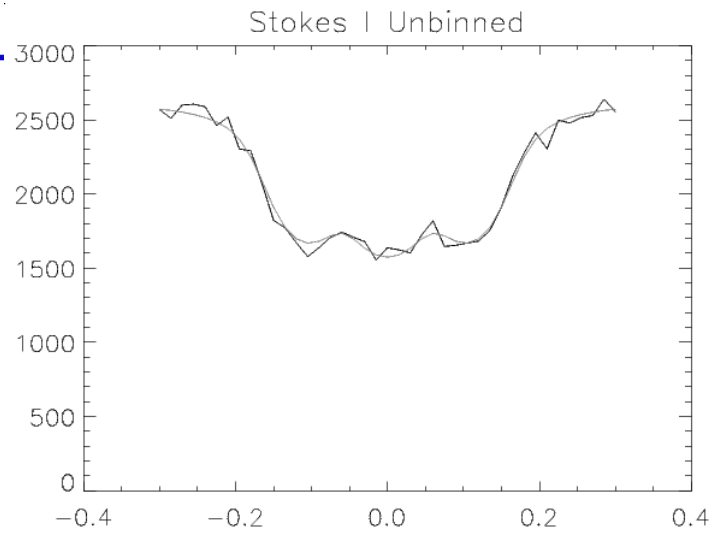


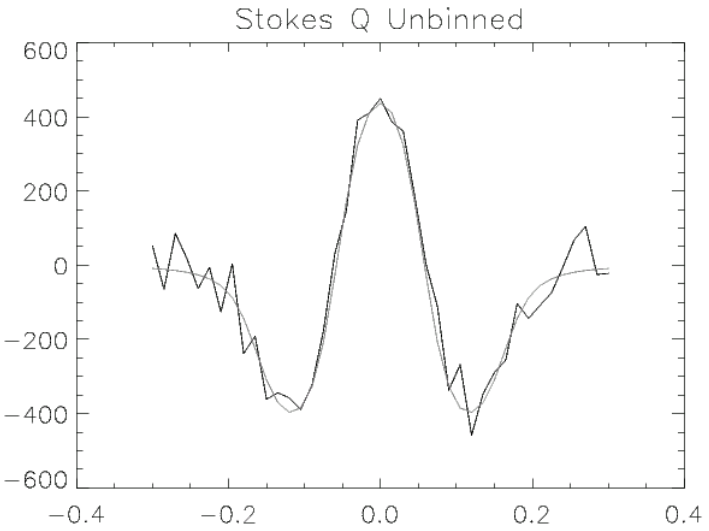


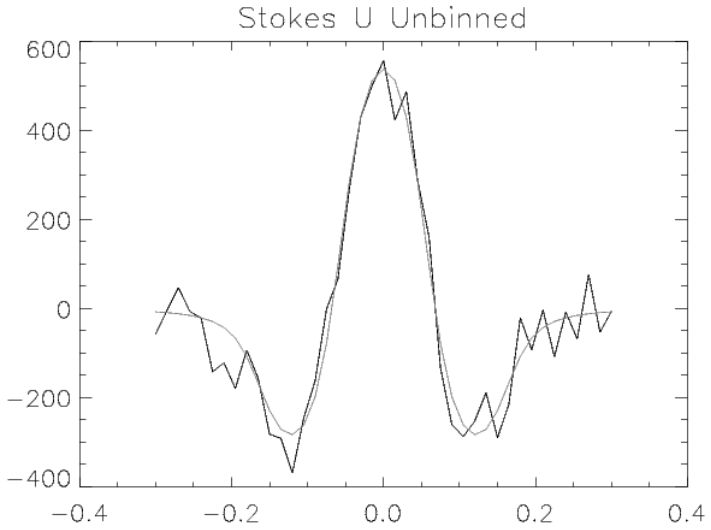


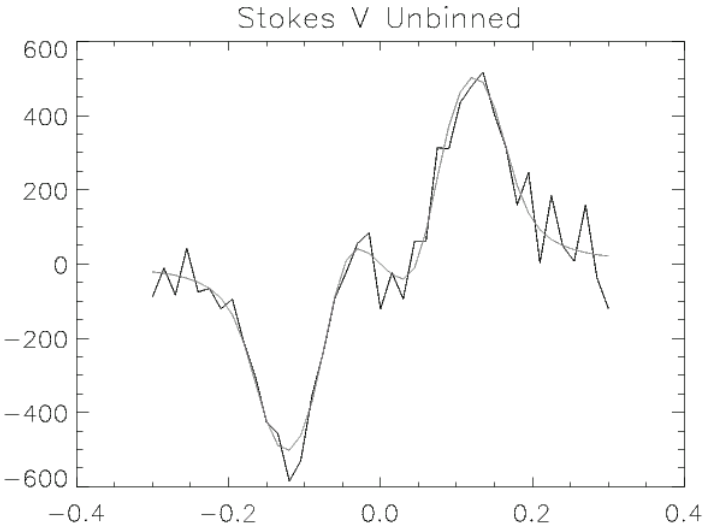


TPD10, High Noise, Sunspot









What's missing?

- We could have used a more sophisticated model for the spectral line. However, our goal is to test the ambiguity codes not the inversion code.
- We could have included other effects such as scattered light or systematic instrumental effects, but thought this would be to complex to interpret.
- Is the noise level realistic? Does it simulate reasonable instruments?
- This can be revisited ....