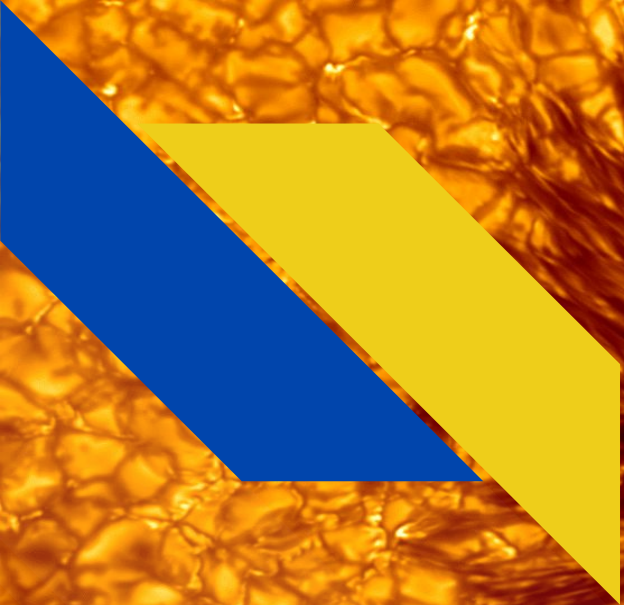
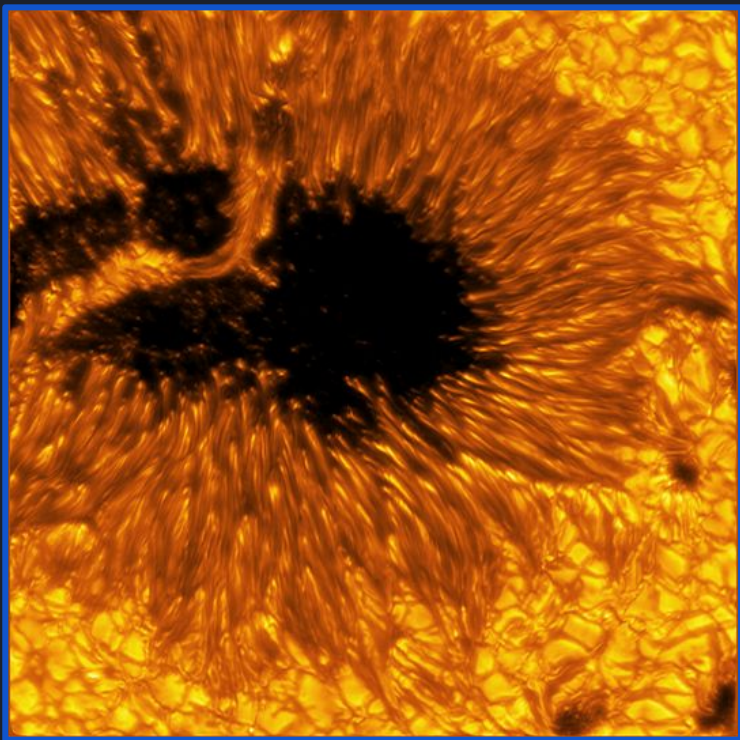




Deep probing of umbral magnetoconvection

2022-12-29T23:35:42.000 WVL=450.4nm



High-resolution observations

Image Credit: NSF/AURA/NSO Image Processing:
Friedrich Wöger (NSO), Catherine Fischer (NSO)

Magnetic structure of a light bridge

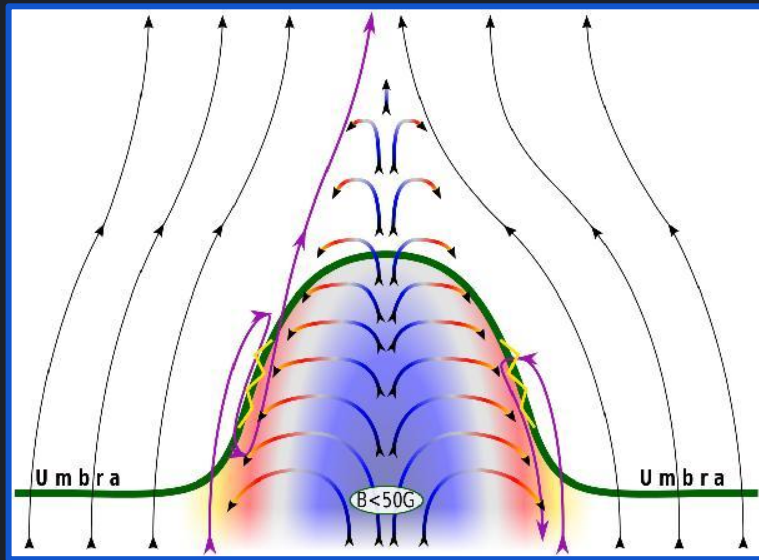


Image Credit: Lagg 2014, Fig 9



GREGOR telescope GRIS instrument

- Spectropolarimetry

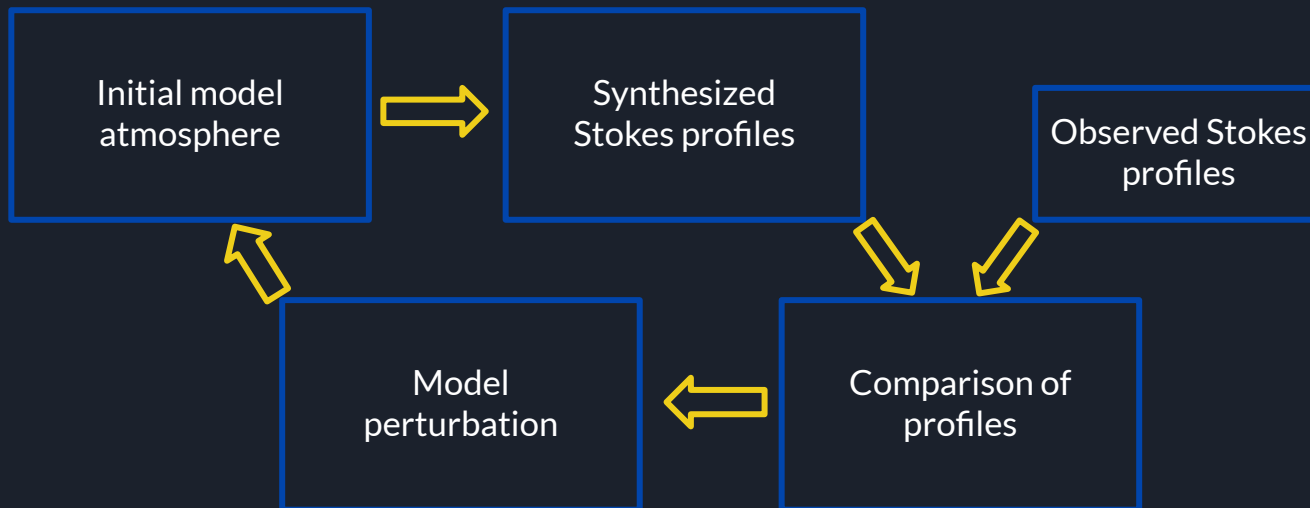
Project outline

- ↓ Observational data of GRIS:
 - Fe I lines in the 1.5 microns spectral range

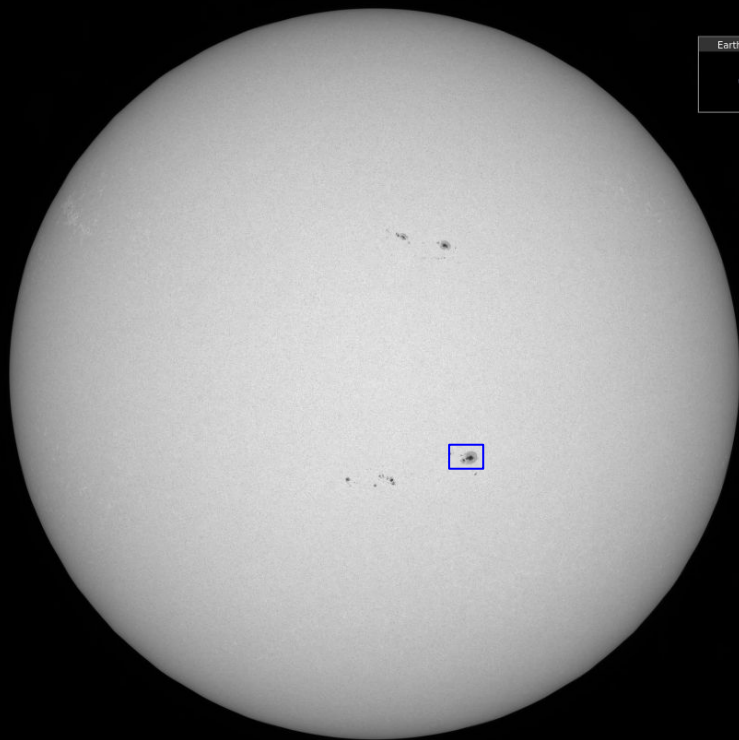
- ↓ Inversions with the SIR code

- Characterization of light bridges:
 - Thermodynamic and magnetic structure
 - Temporal evolution

Stokes Inversion Codes



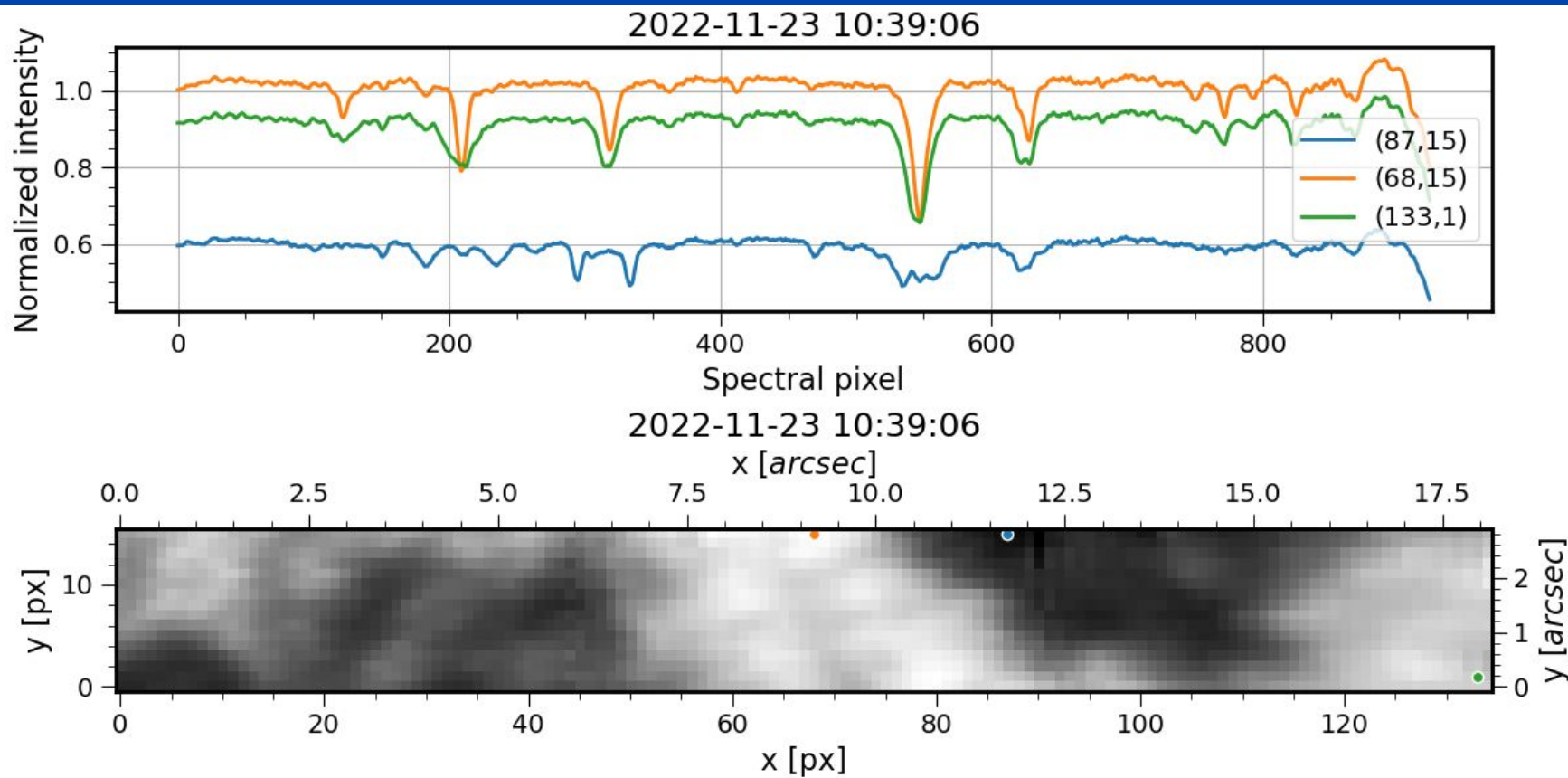
Observational data



Observational data

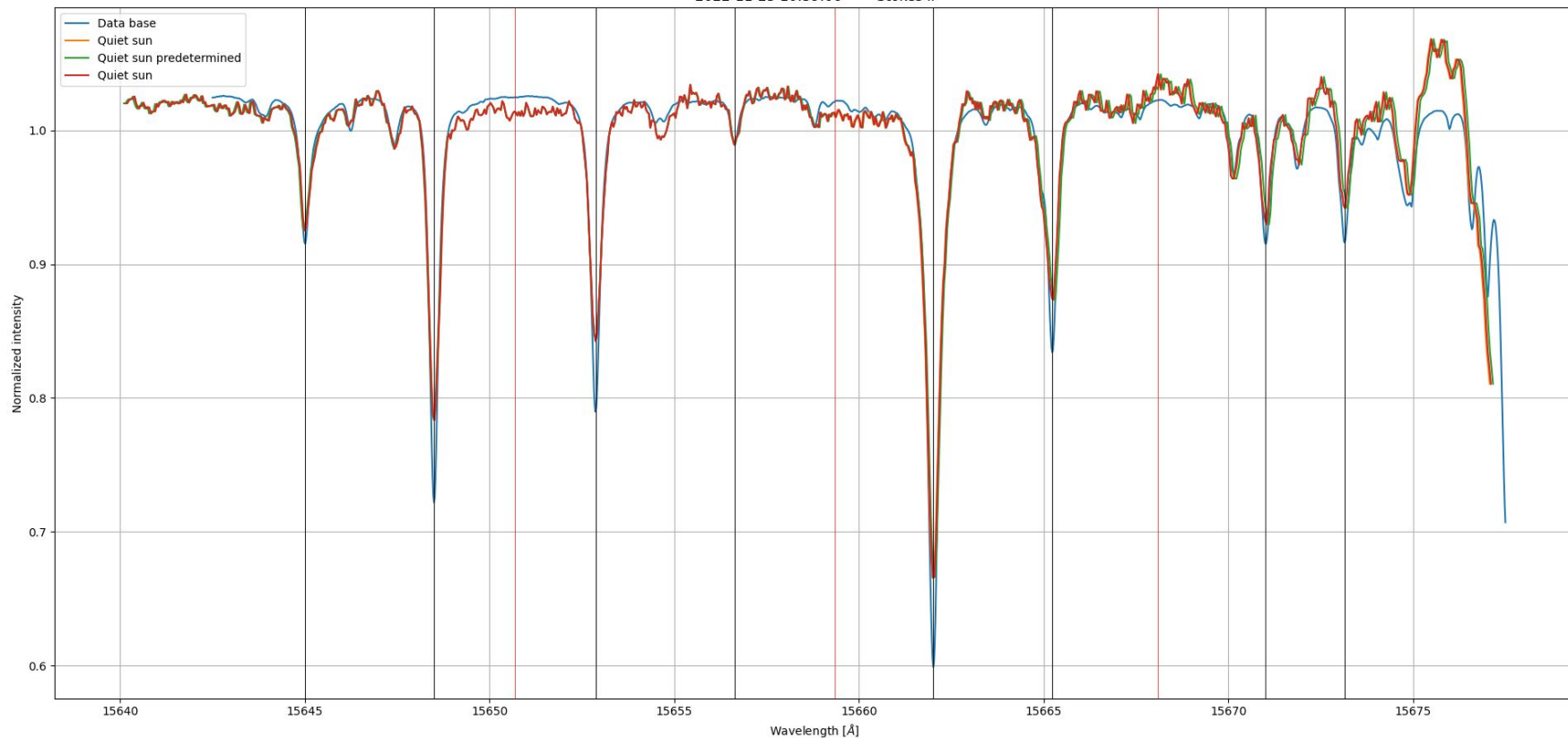


Observational data

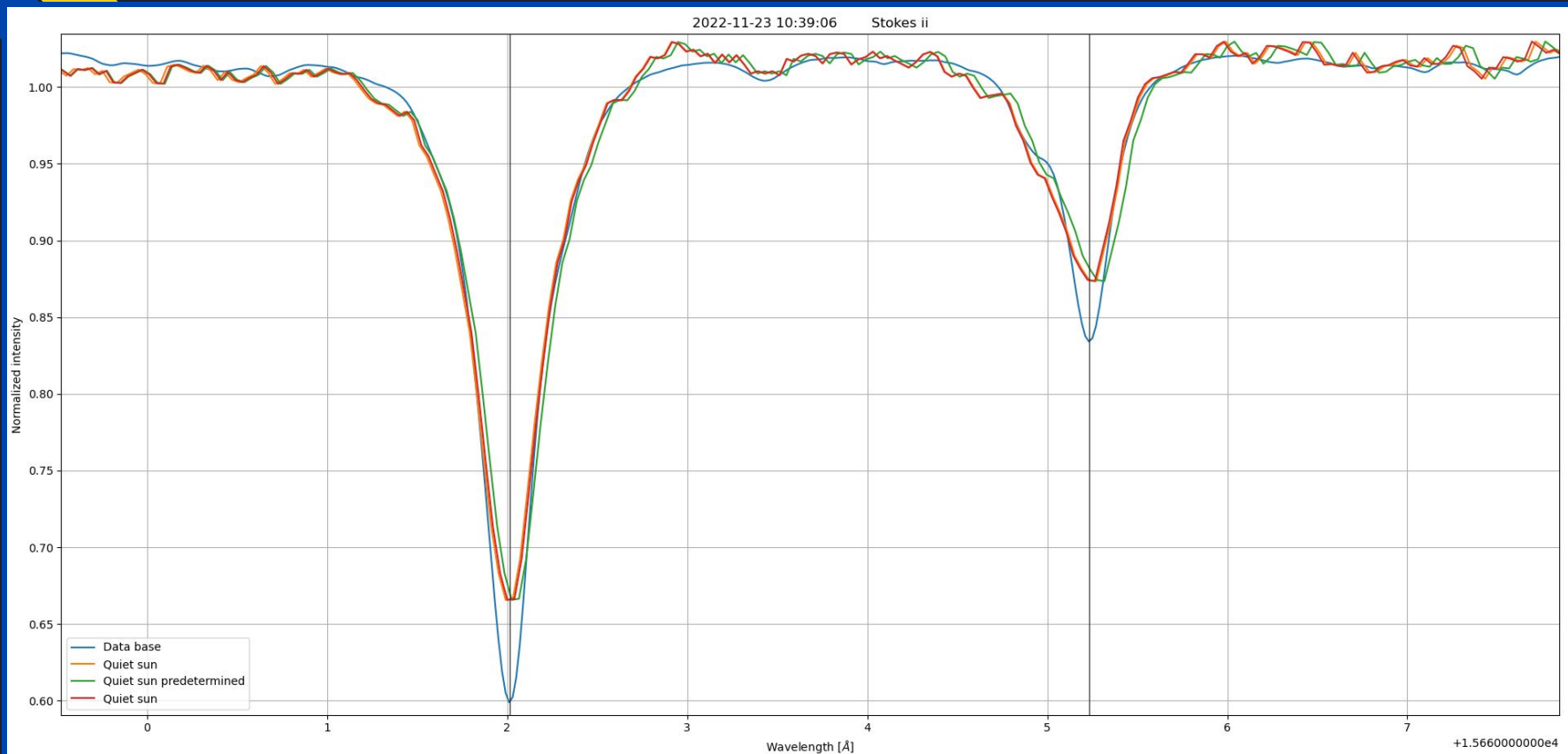


Spectral calibration

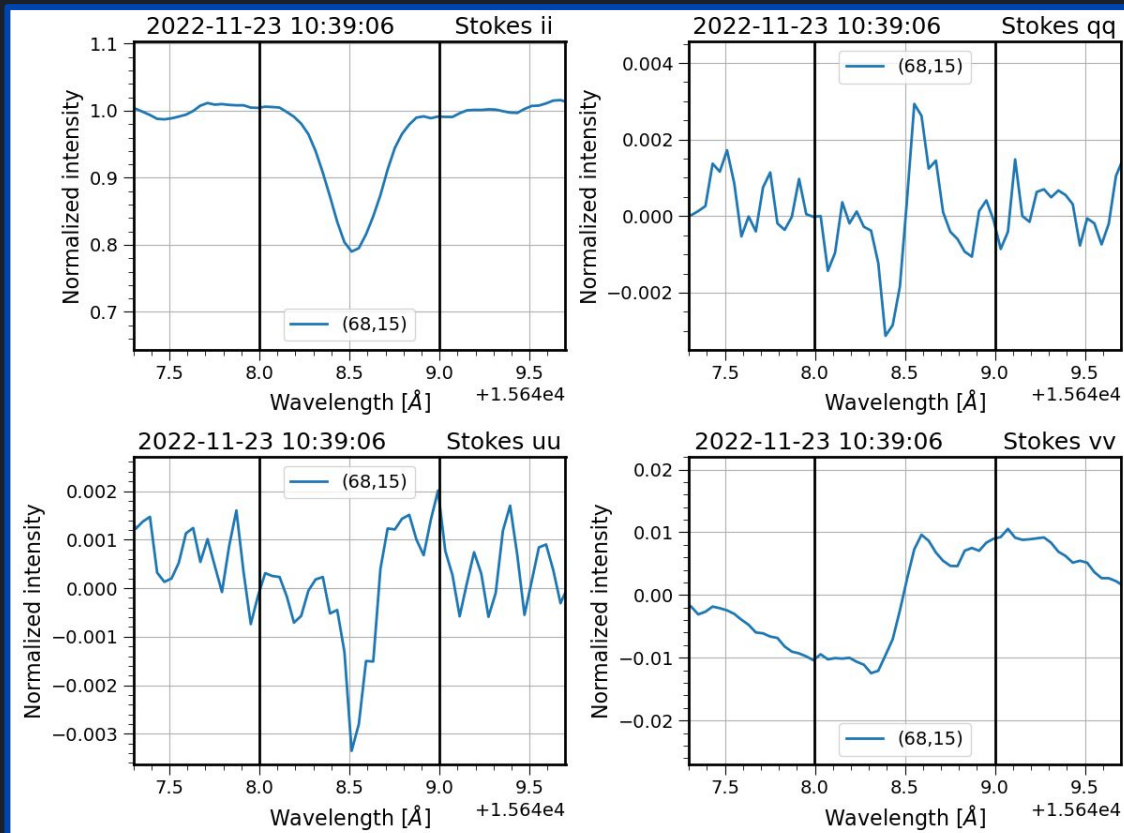
2022-11-23 10:39:06 Stokes ii



Spectral calibration

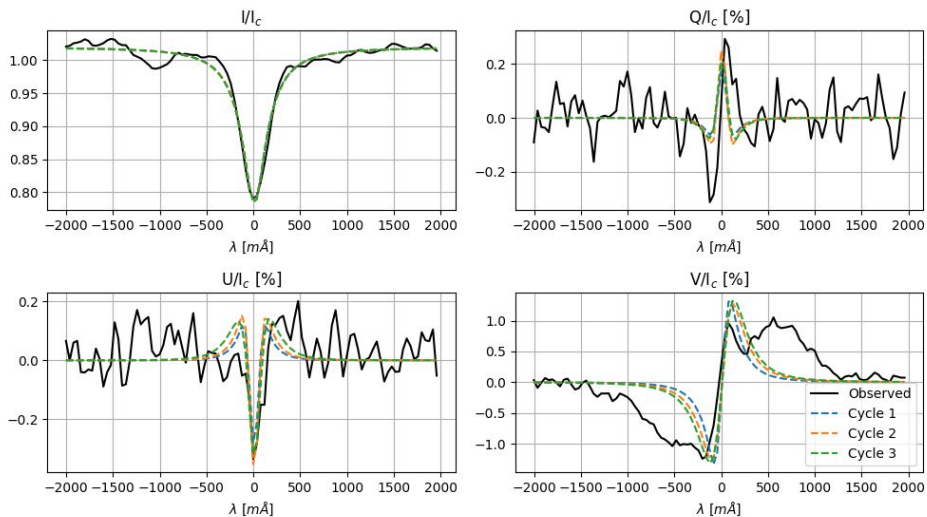


SIR Inversions



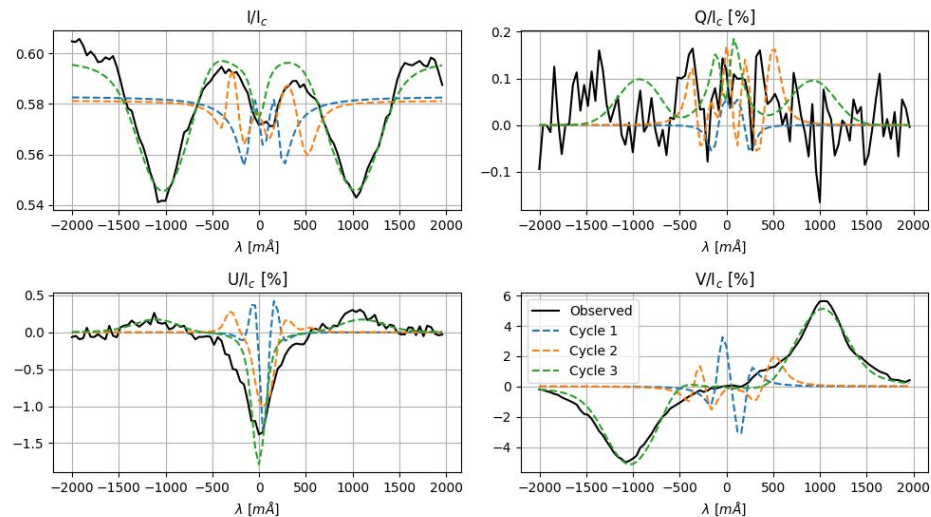
SIR Inversions

Stokes, $x=68, y=15$



Light bridge

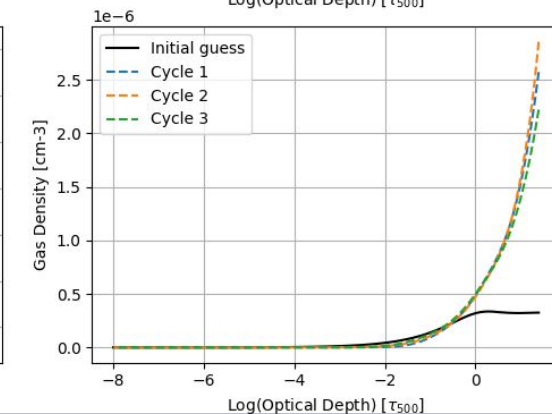
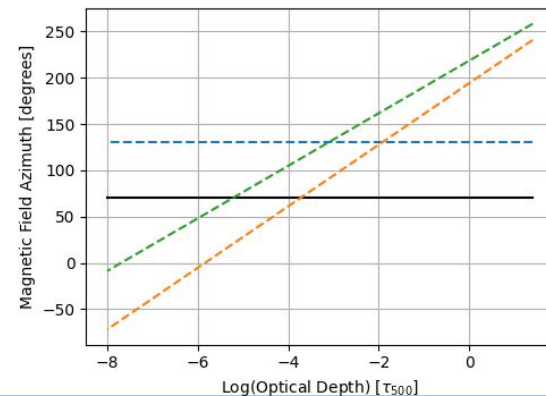
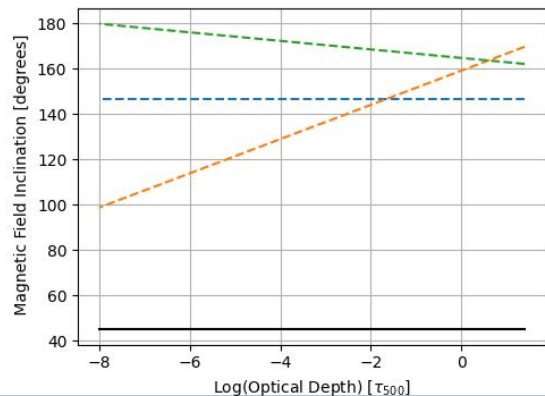
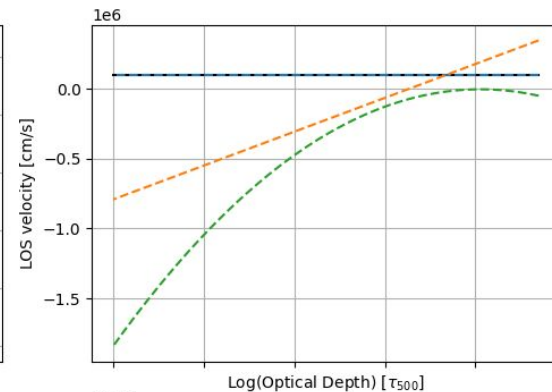
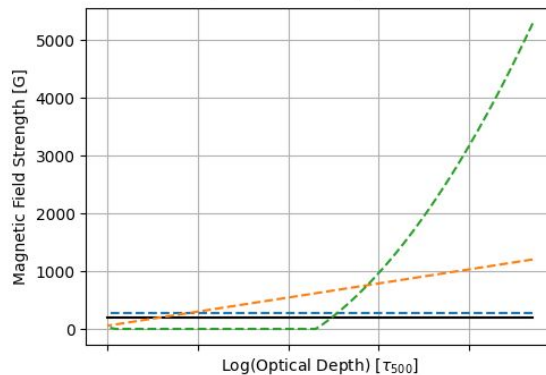
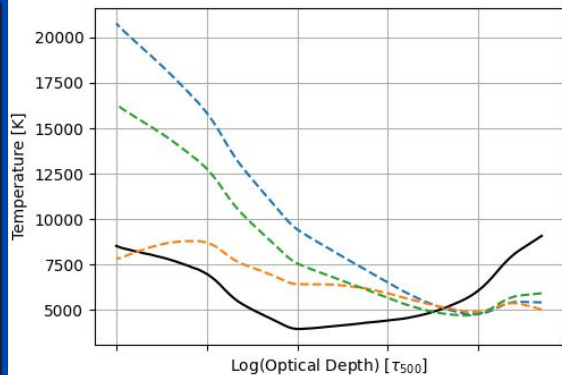
Stokes, $x=87, y=15$



Umbra

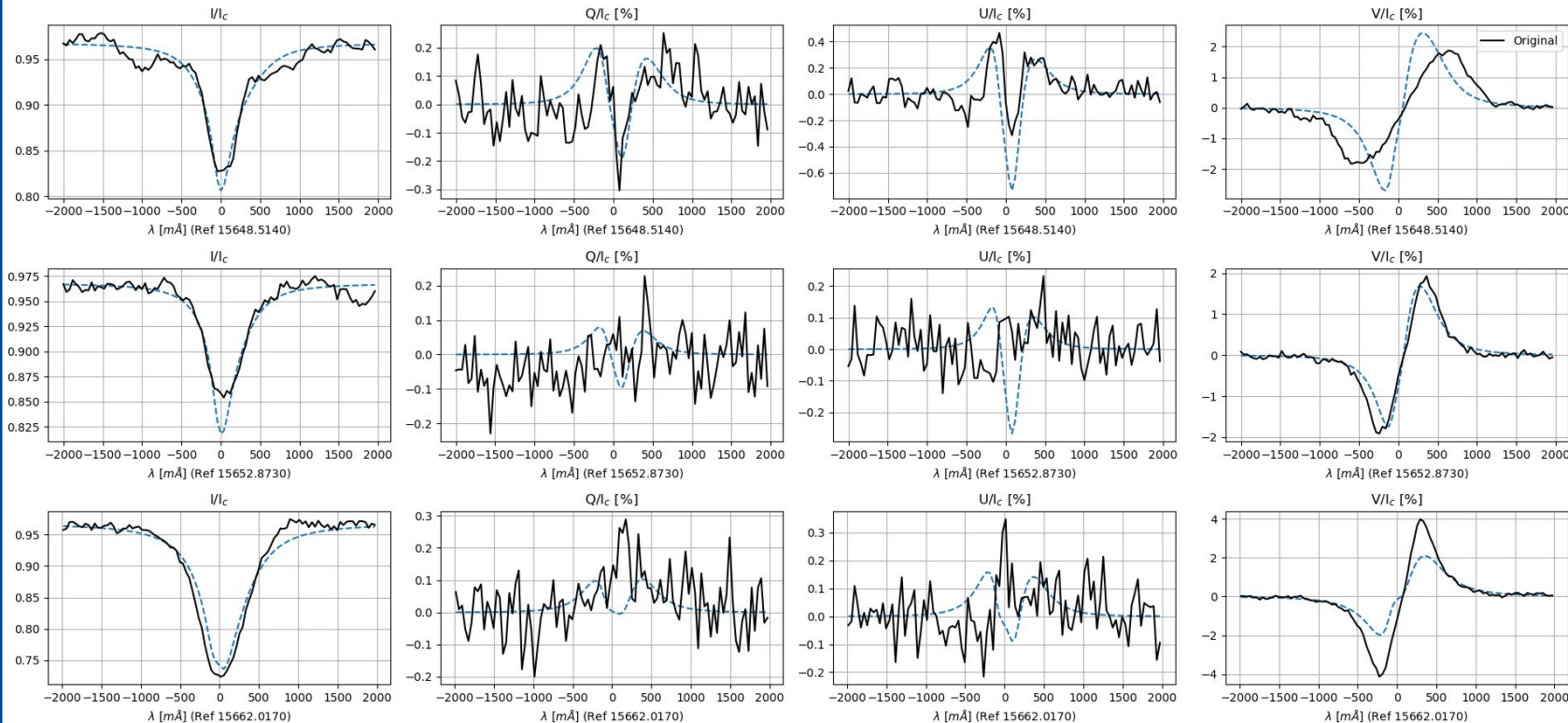
SIR Inversions

Atmospheres, $x=87, y=15$



SIR Inversions

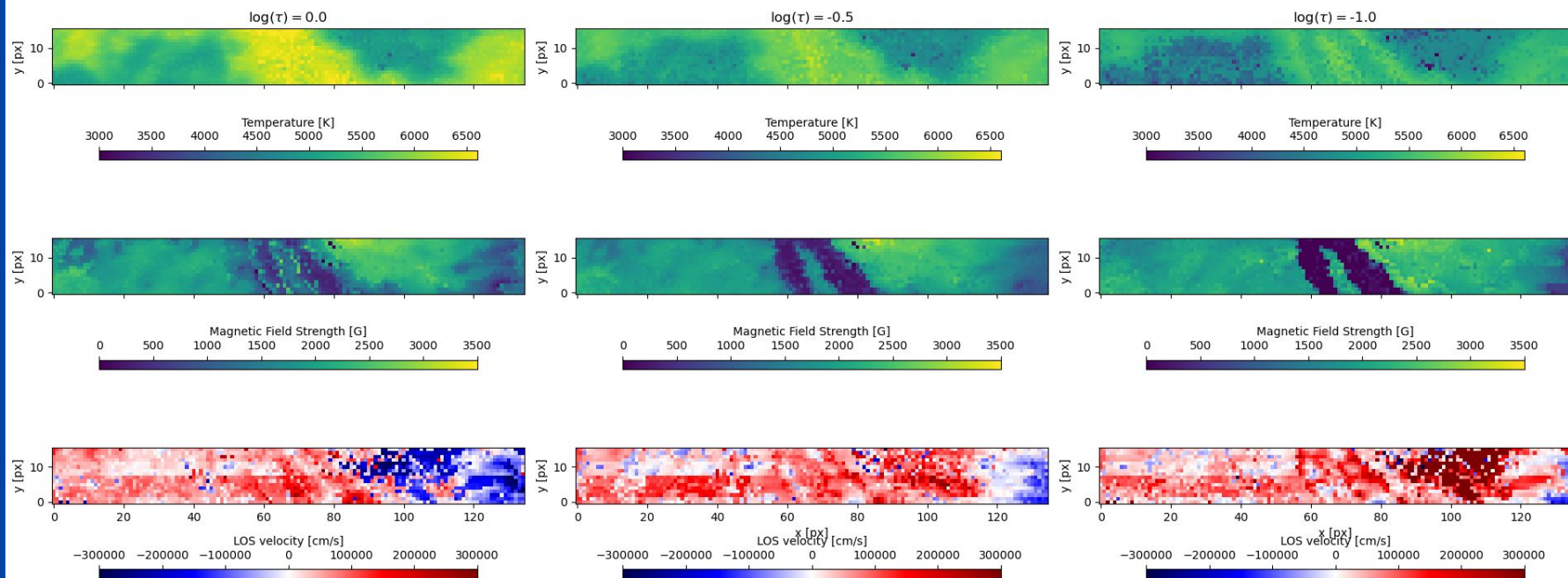
Stokes, $x=72$, $y=4$, $\chi=684.59$



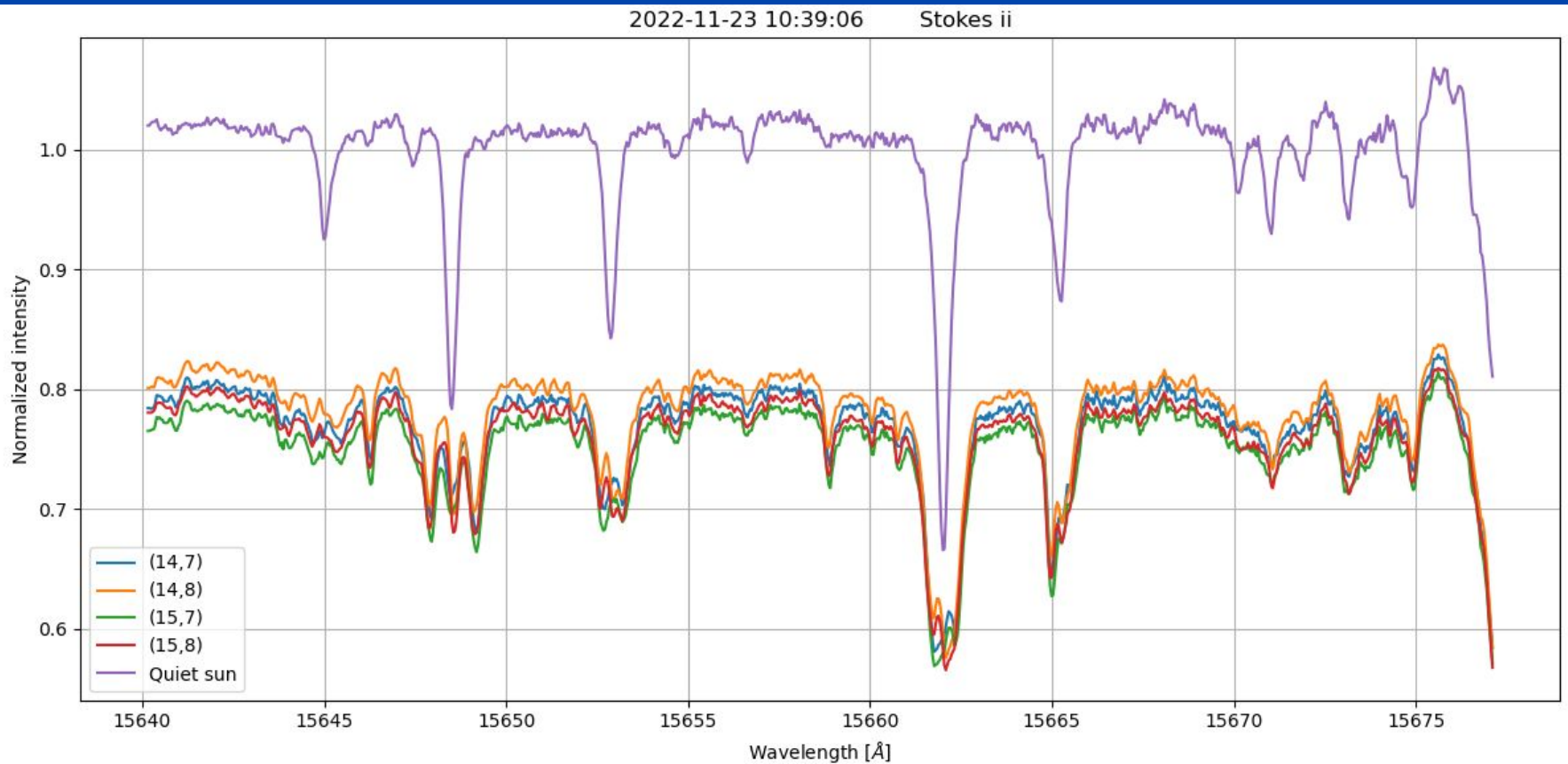
SIR Inversions

- Temperature
 - Magnetic field
 - Strength
 - Inclination
 - Azimuth
 - Line-of-sight velocity
-
- Microturbulence
 - Macroturbulence
 - PSF
 - Stray light

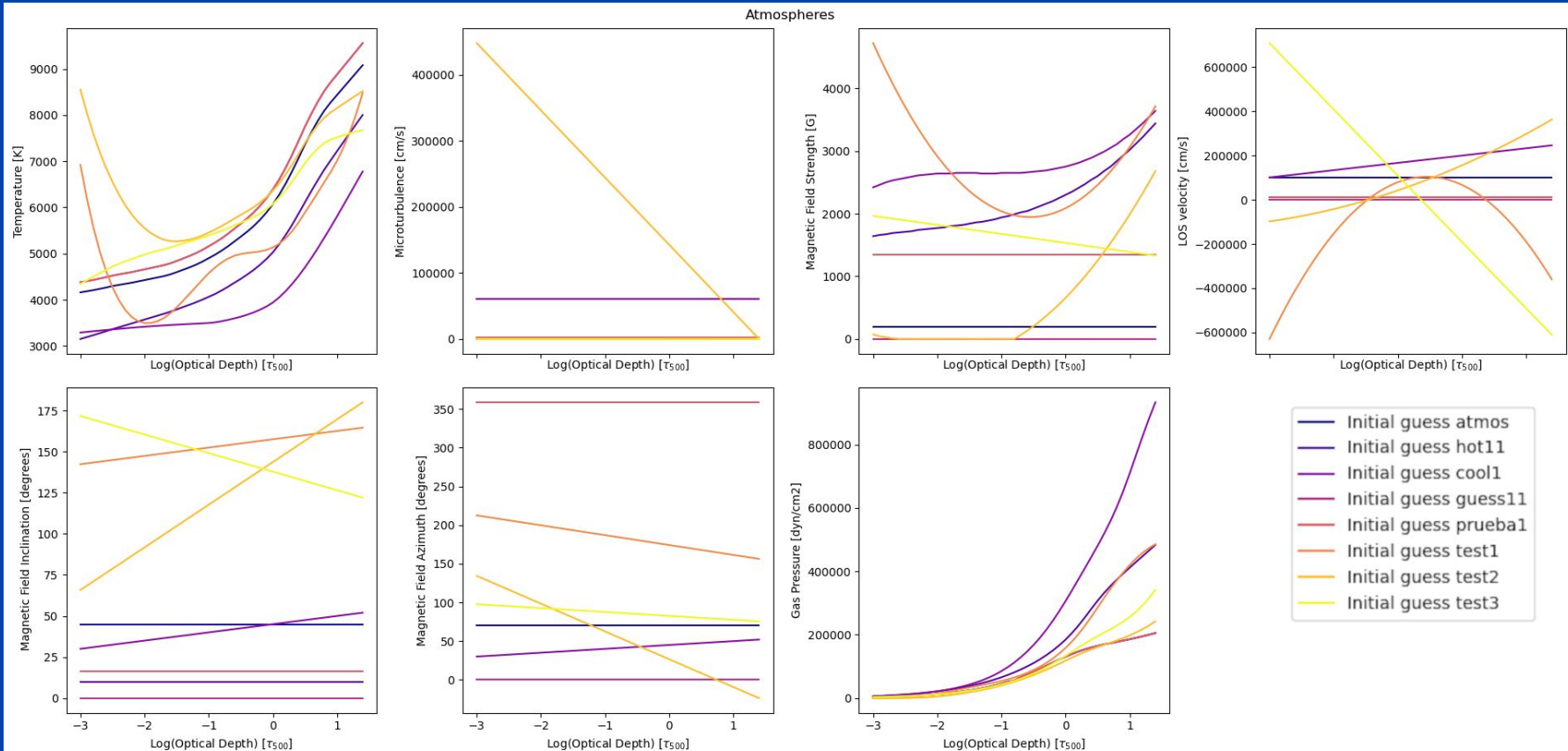
SIR Inversions



SIR Inversions



SIR Inversions





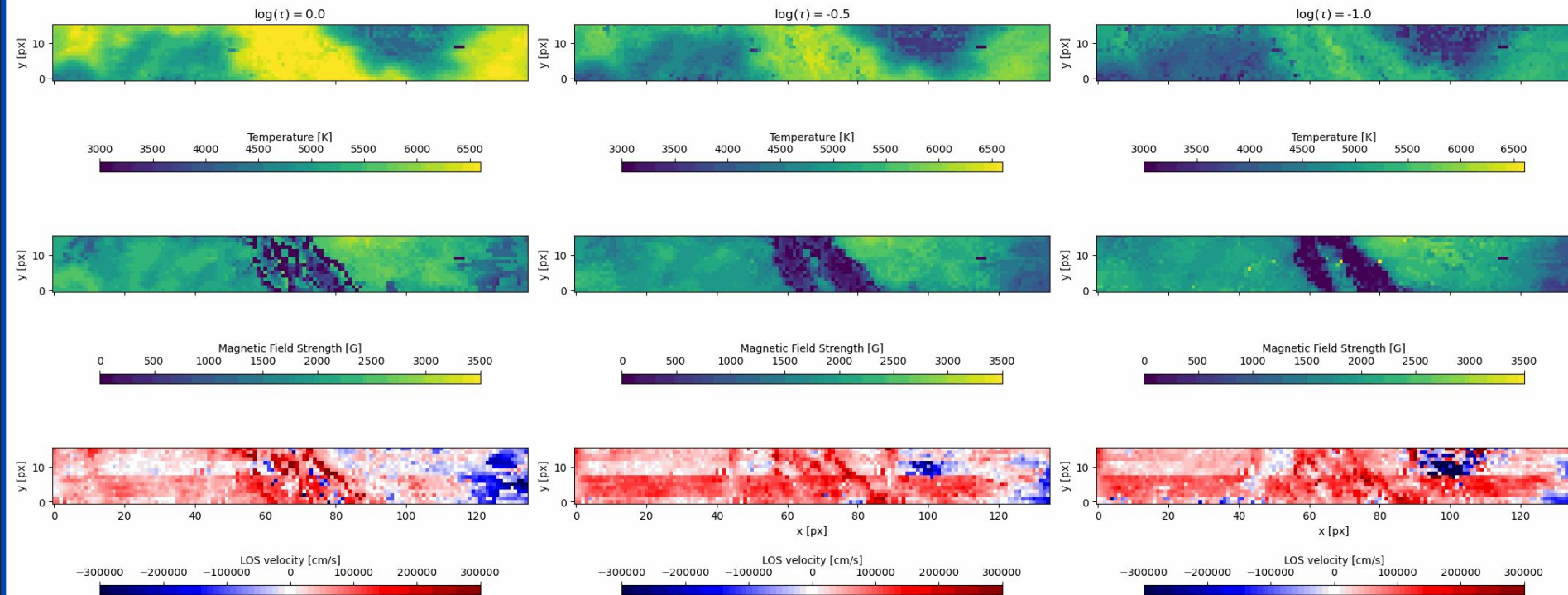
SIR Inversions



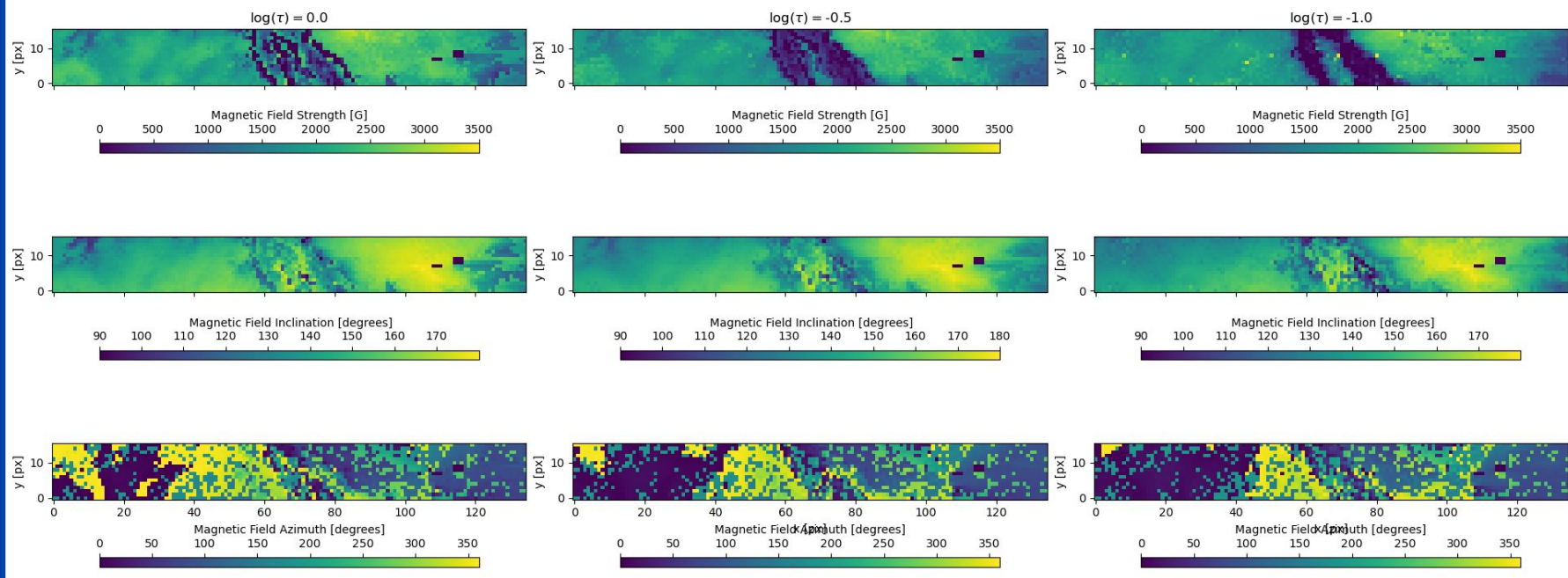
HTC Condor

Software Suite

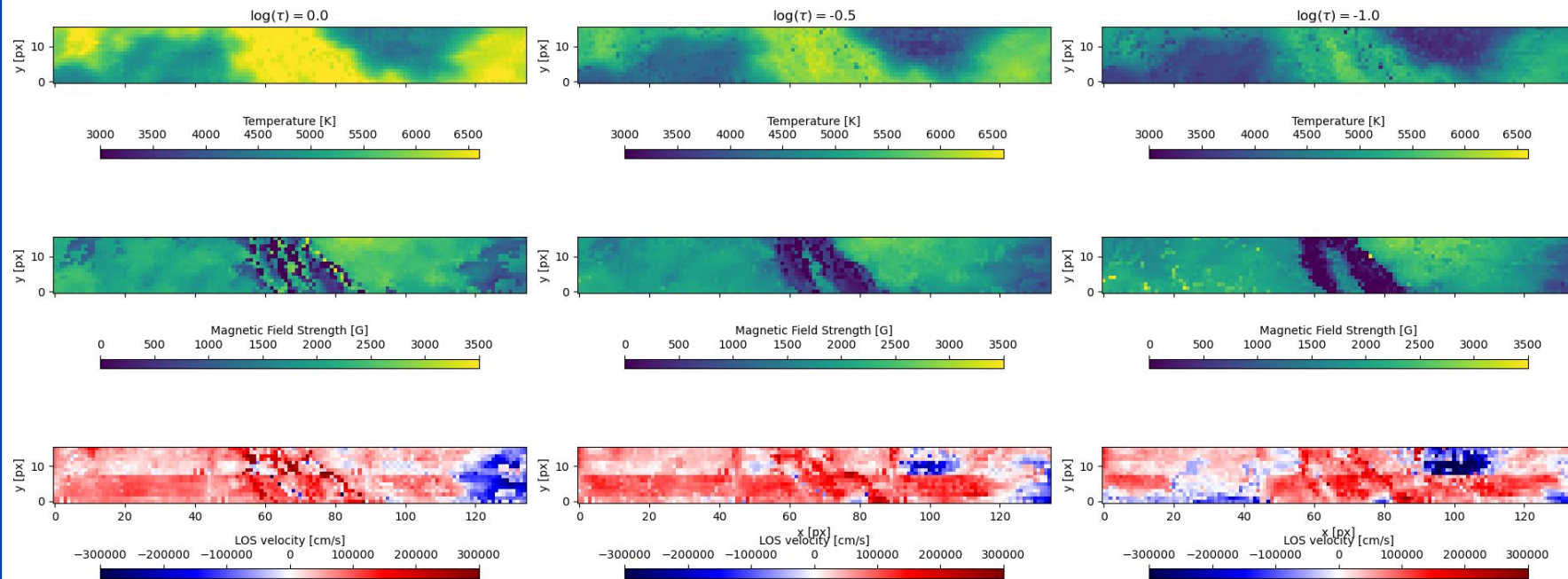
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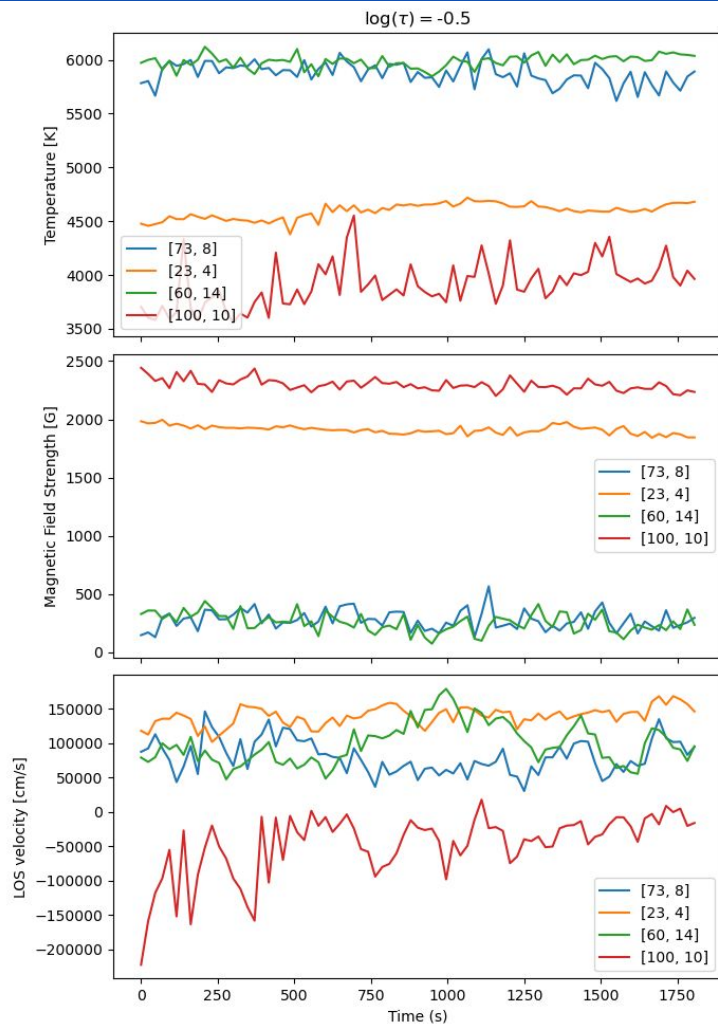
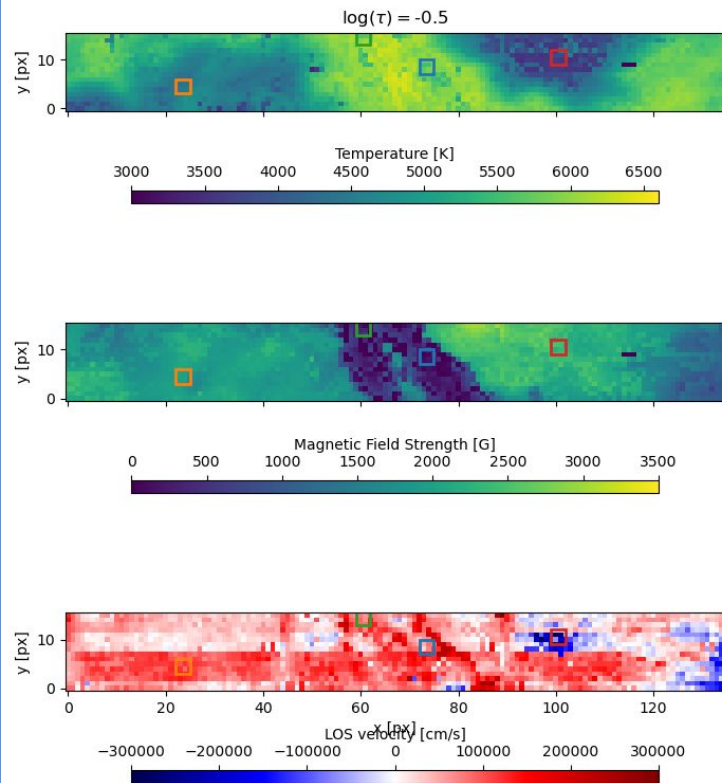
SIR Inversions



SIR Inversions



Temporal evolution



Future work

- Solve problems in the spectra
 - Velocity horizontal line
- Study magnetic field enhancement



Acknowledgements

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