# Spectral lines: synthesis

- Fe I 6301+6302+6303, Fe I 5247+5250, Fe I 15648+15652, Fe I 6173, Mn I 5537, Mn I 1.52, Si I 10827
- SPINOR (Michiel, Andreas), SIR (Reza,JM), LILIA-NICOLE (Nikola, Hector), MISMA (Bartolomeo)
- Andres gathers and averages

# Spectral lines: inversions full MHD resolution

- Employing simulations: Arturo vs Thorsten: ALL LINES different snapshot for training and inversion
- Tau-dependent: Ex 1) Fe I 6301+6302; Ex 2) Fe I 6301+6302+6303, Fe I 5247+5250, Fe I 15648+15652
- ME: Ex 1) 6302; Ex 2) Fe I 6301+6302
- Spectral range for 6301+6302: 6301-6303

# Code users

- SPINOR (Michiel, Andreas), SIR (Reza,JM), LILIA-NICOLE (Nikola,Hector), MISMA (Bartolomeo)
- HAO/ASP (Bruce), VFISV (JM), Helix++ (Andreas)
- Arturo (tbd) and Thorsten (IMAP)

# Inversion full MHD resolution

- 1 component + no filling factor
- MISMA possible ?
- Freedom of selection for nodes positions and number, and weights
- Same for other fudging parameters: macro, micro, damping enhancement
- Same atomic parameters and abundances: JM provides
- We all save the best-fit profiles
- Same wavelength ranges (also ME codes among themselves)

# Non ideal examples: Instrument case Spectrograph

- 0.3”; 0.1”; 1” (QS)
- 1E-3; 1E-4
- QS+Plage+Sunspot
- 6301+6302
- Include by default a non-magnetized atmosphere
- Total: 14 inversions

# Non ideal case Instrument filter

- 0.1”, 0.3”
- QS+Plage+Sunpot
- 1E-3
- 5250 (5 and 12 points; 65 mA FWHM with 60 and 32 mA sampling, respectively)
- Total: 12 inversions

- 1 min pixel
- 50000 pixels = 50000 min = 833 hours = 35 days (no crash, 1 cpu)
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# Priorities # 1

- 3000*16 column from Matthias: 16*16*12 km
- Synthesis
- Inversion full resolution
- All codes
- QS: 1536*1536 at 24*24*12 with mixed polarity: +10, -10.

# Priority # 2

- For those codes that are able to: use ME and tau-dependent inversions for a 2 magnetic component inversion in some selected regions of wierd profiles (e.g. Penumbra)
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# Further test for ME before inversion

- Produce a few more cases to make sure codes give the same numbers. Compare also shape of profiles
- B=10,100,500,1500,3000
- G=0,45,90
- Phi=30
- Vlos=0
- 10 mA, -500,+1500, 6301.5D0,6302.5D0
- A=0.1
- DLDOP=30
- ETA0=10 (for 6302.5); ratio=2.80D0
- S0=S1=0.5

# Further tests for tau-dependent codes before inversion

- Opacity tables with T=2500 to 10000 in 500 K steps
- Pelec=1E-3 to 1E3 in decades in log steps
- Lambda= 5000,15000

# Comparison with simulations

- For tau-dependent: logtau=0,-1.-2,-3,-4. Asl Thorsten and Arturo to convert to Tau.
- For ME: use RF to temperature ? Calculate them while synthesizing with SIR
- For spatially averaged simulations do not do anything. Will be decided later.

# Schedule

11 February: web to exchange data

- MHD cubes: 3000*16*192
- Presentations
- Atomic data and wavelength ranges
- Schedule
- Group picture
- Nikola's paper

- 11 March: synthesis for full resolution [lambda,4,3000,16], split in regions, I/Q/U/V
  - Include 5 wavelength files with exact value sused for synthesis
  - Input: FITS
- + 2 week aprox: Andres averages
  - Report
  - Output: same format (FITS) and dimensions
- Deadline for inversion results Experiment 1: mid May => results to JM