Sunspots & Fe 15648 Å

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The Neolithic View







Observing Procedure

- Clear sky (around Sun)
- 80 cm main image, 13.5 m spg, InSb diode
- Make sketch map of spots (positions TBD)
- Image slicer (2.5x2.5 arc sec)
- Seek out darkest position in umbra (15652Å)
- One observation per day of each spot
- Scan time ~ 10 sec; noise is seeing

Fe 15648.518 Å

- Zeeman splitting ~ g λ^2
- g=3
- Line completely Zeeman split in all umbrae
- Measures total field strength (not flux)
- Central depth ~ .2 (phot) to .1 (umbra)
- Excitation = 3 v; rel. temperature insensitive
- Relatively blend free
- Nearby OH 15651.96 temp sensitive
- BEST umbral field diagnostic

Fe15848 Quiet Center to Limb











2001 to June 2011







2 Aug 2011 spots



McMath View





OH 15652 line depth



OH all data + OH August



Summary

- Fe 15648 is unique for measuring spot field strength (magnetographs yield flux)
- Average maximum umbral field strength diminishing 1991-2011
- Minimum umbral field is 1500 G
- Umbral temperature is based on OH depth and/or continuum intensity

Through August 2011

