12th European Solar Physics Meeting
8 - 12 September 2008
Freiburg, Germany

Electronic proceedings

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2.1-03

Local Helioseismology with GFPI at the Vacuum Tower Telescope, Tenerife

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Local Helioseimology has recently become an important tool to investigate the Solar Interior in the vicinity of localized phenomena like sunspots. It possibly holds the promise to give informations about subsurface magnetic fields and material flows. We are currently modifying the GFPI Instrument at the VTT which will also be a First Light Instrument at GREGOR Telescope to the needs of ground-based helioseismologic observations (GFPI: Göttingen Fabry Perot Interferomer).

The upgrade consists of a CCD-camera with a larger Field-of-View (100"-by-100"), a modified Interfacing Hardware and dedicated Control- and Recording-Software. Direct Interfacing to the VTT's telescope control system allows for mosaic type patching of the observations field. Cadence times of below 1 Minute for a 300"-by-300" field at the telescope's resolution limit of 0.2" are possible. Data are stored to USB-based external harddisks. An of-the-shelf beamer allows for optical adjustments with an artificial light source.

Available Preprocessing Tools allow to immediately visualize the quality of the observational data. This includes a prelimary Ringdiagram Analysis. Future Online Preprocessing Capabilities are to further reduce the achievable cycle times.

We will present some details of the instrumental setup and some prelimiary observational results.

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Project Title.....: HELLRIDE HELioseismological Large Regions Interferometric DEvice

Scientific Target..: Investigation of Subsurface Flows and Fields in Activity Regions

Special Features.: Large Area Scanning (300 by 300 Arcsecs)
at Full Telescope Resolution (0.2 Arcsecs)
with Short Cadence Cycles (< 1 Min)
over Extended Times (ca. 12 Hours)

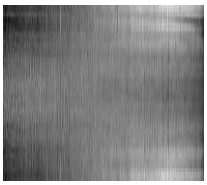
Instruments.....: VTT

Modified GFPI
(Göttingen Fabry Perot Interferometer)

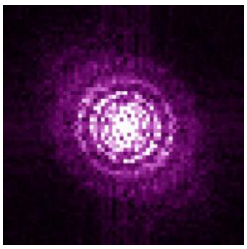
FPI Configuration.: Dual Etalon Collimated Beam
CCD Camera DALSA 1M30 (1024x1024 Pixels)
Primary Field-of-View 100x100 Arcsecs
VTT Mosaic Patching (3x3 Patches)
Line Scanning Fe 5434 Angstr. (20/40 Wavelength Steps)
Exposure Time 5 ms

Data Processing

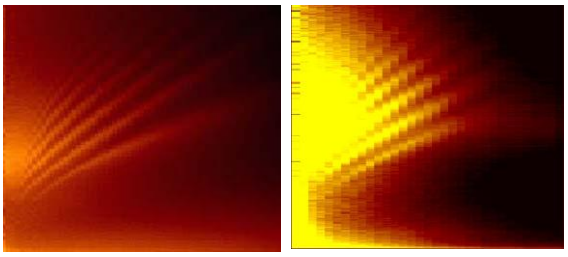
Wavetrain



Ringdiagram



SOHO VS. VTT



Outlook.....: Realtime Velocity Maps (Storage Reduction by Fac. 20 / 40)
Time-Distance Analysis
Modified Ringdiagram Analysis