

Spectropolarimetric observations of filaments in Ha and D3

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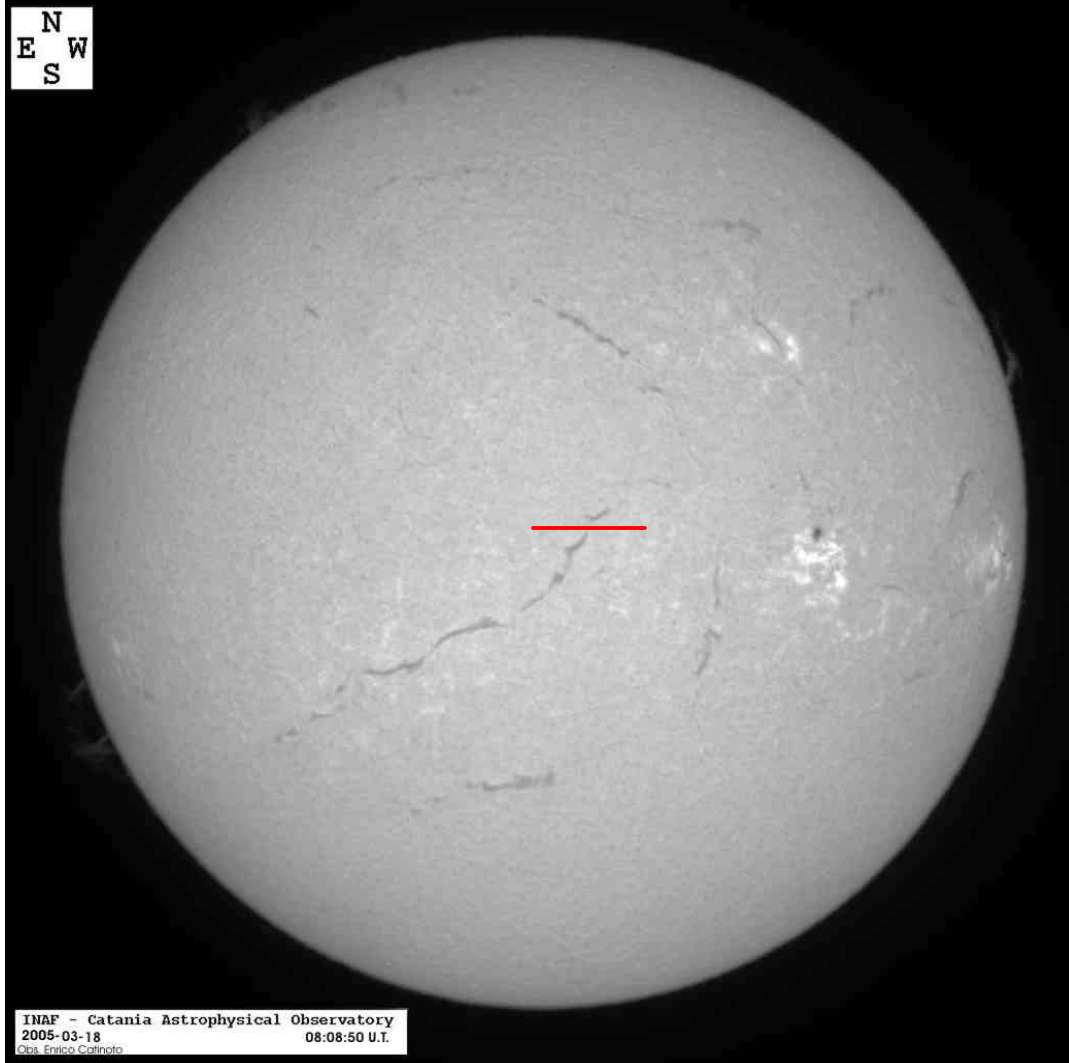
Motivation of the work

- Extension of our prominence observing program for investigating their magnetic field (see poster by Renzo Ramelli et al.)
- Preliminary study in view of future filament observations with a Fabry Perot filter (Alex Feller talk)
- Exploration of the diagnostic potentiality of the Hanle effect in forward scattering and/or other physically plausible mechanisms

Observations at IRSOL

- Full Stokes spectro-polarimetric measurements using ZIMPOL2
- 19 H α , 6 He D3 line observations over 10 days
- Positive Q/I defined to be parallel to the local direction of the filament
- Integration time: 10 to 30 minutes
- Observations at disc centre

Observation in H α March 18 (2005)

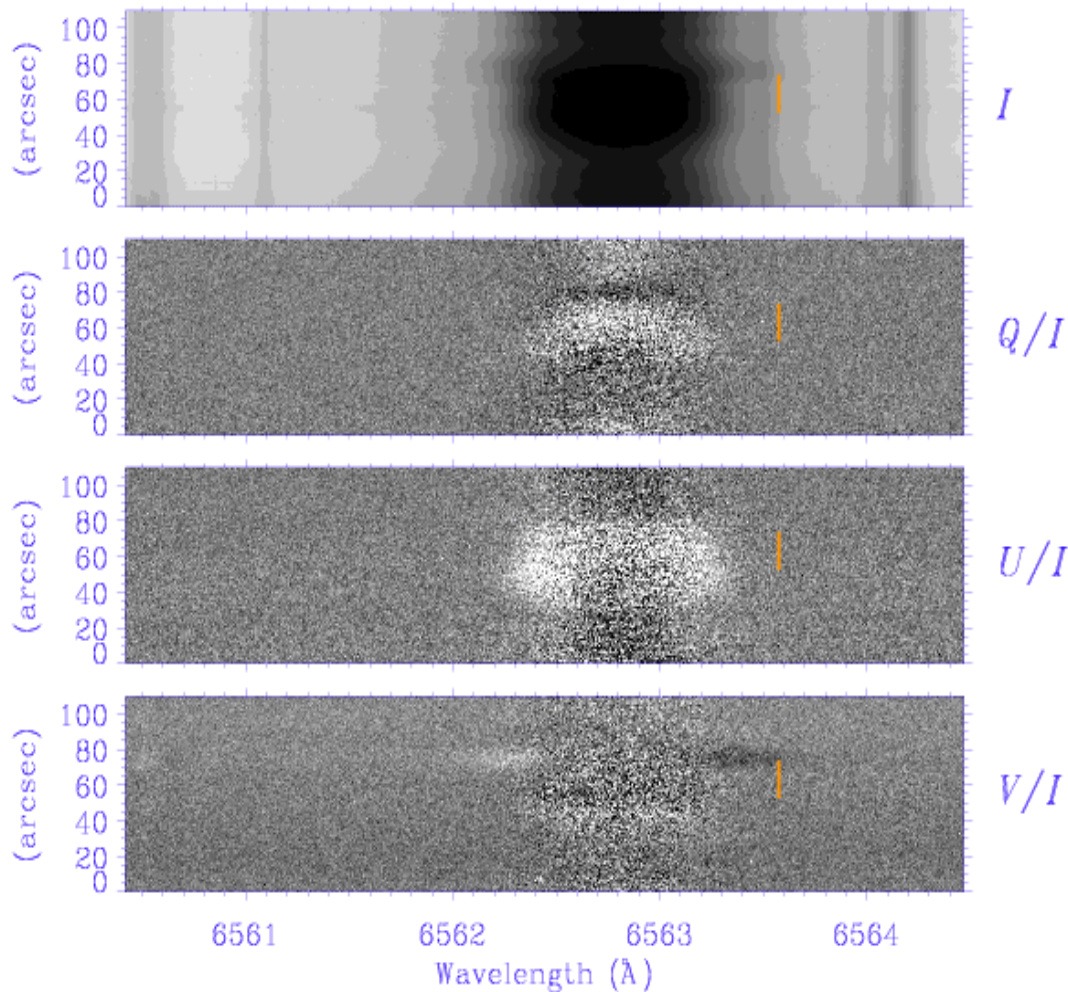


H α disk image

The red line indicates the slit position during the observation

Stokes images

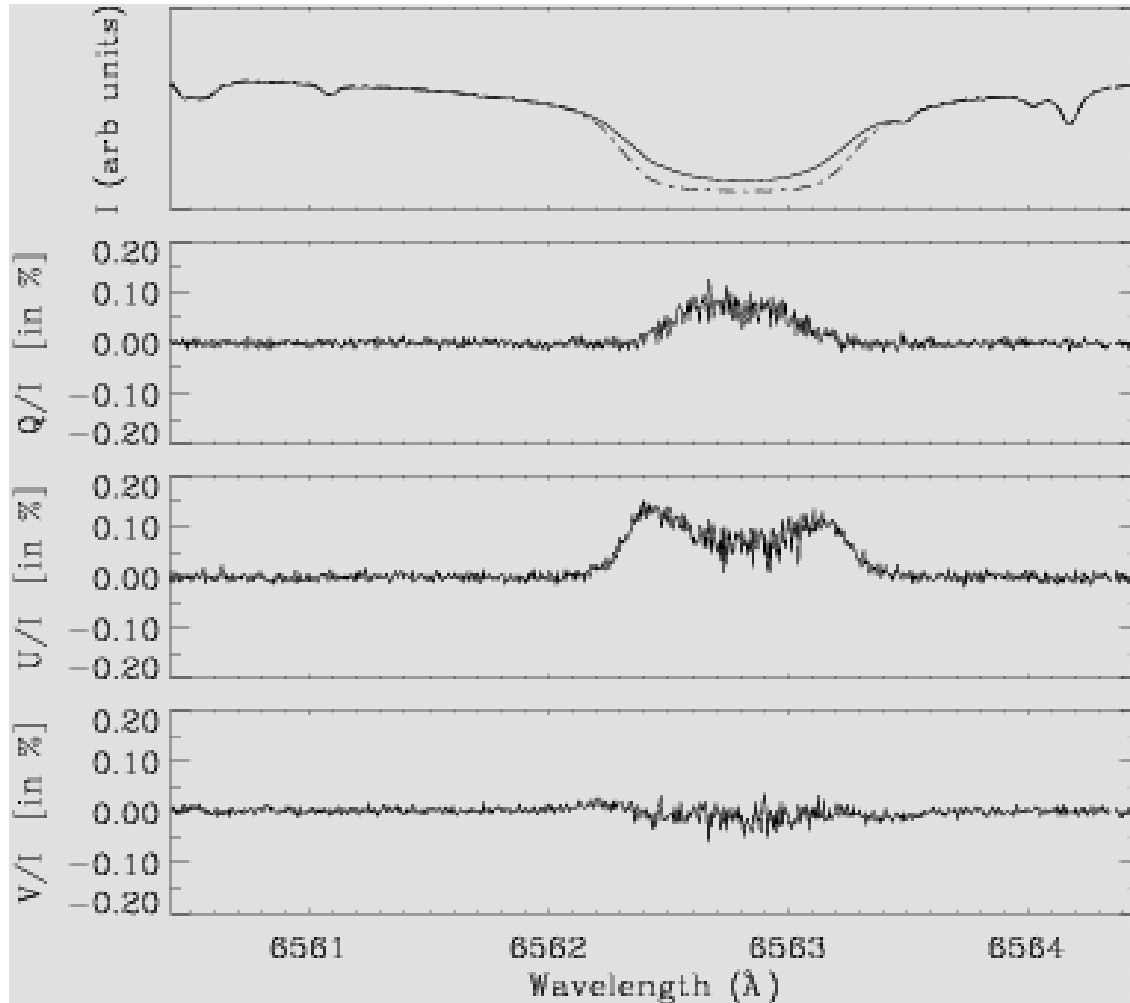
Filament-observation at disk center



Along the spatial direction different structures can be recognized

Stokes profiles are obtained by averaging along the vertical orange interval (see next Figure)

H α - Stokes profiles in the filament



Almost all the observation
give similar shapes

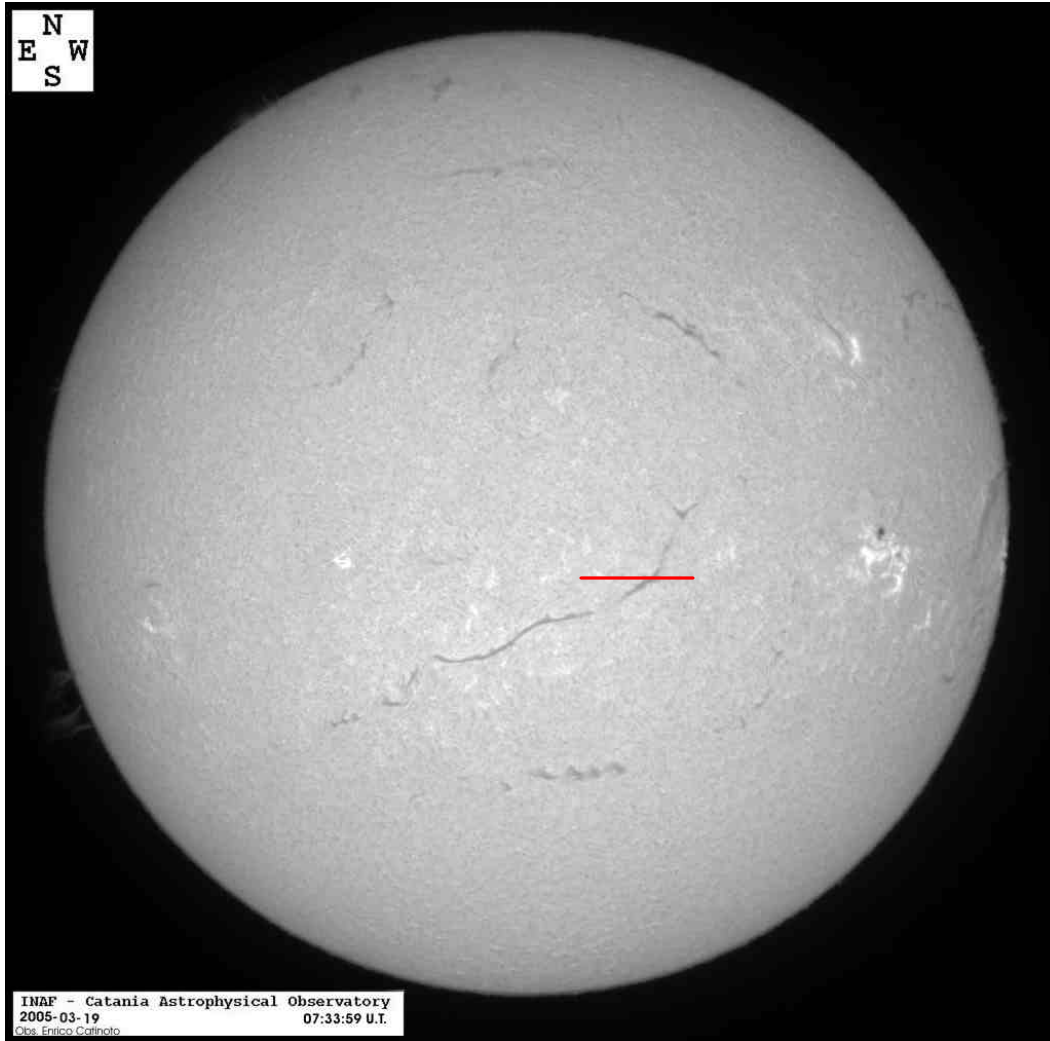
(linear polarisation amplitudes vary, but are of
the order of a few times 10^{-3})

A Q/I peak at line centre

Wing peaks in U/I

V/I signals are generally
absent

Observation in He D3 March 19 (2005)

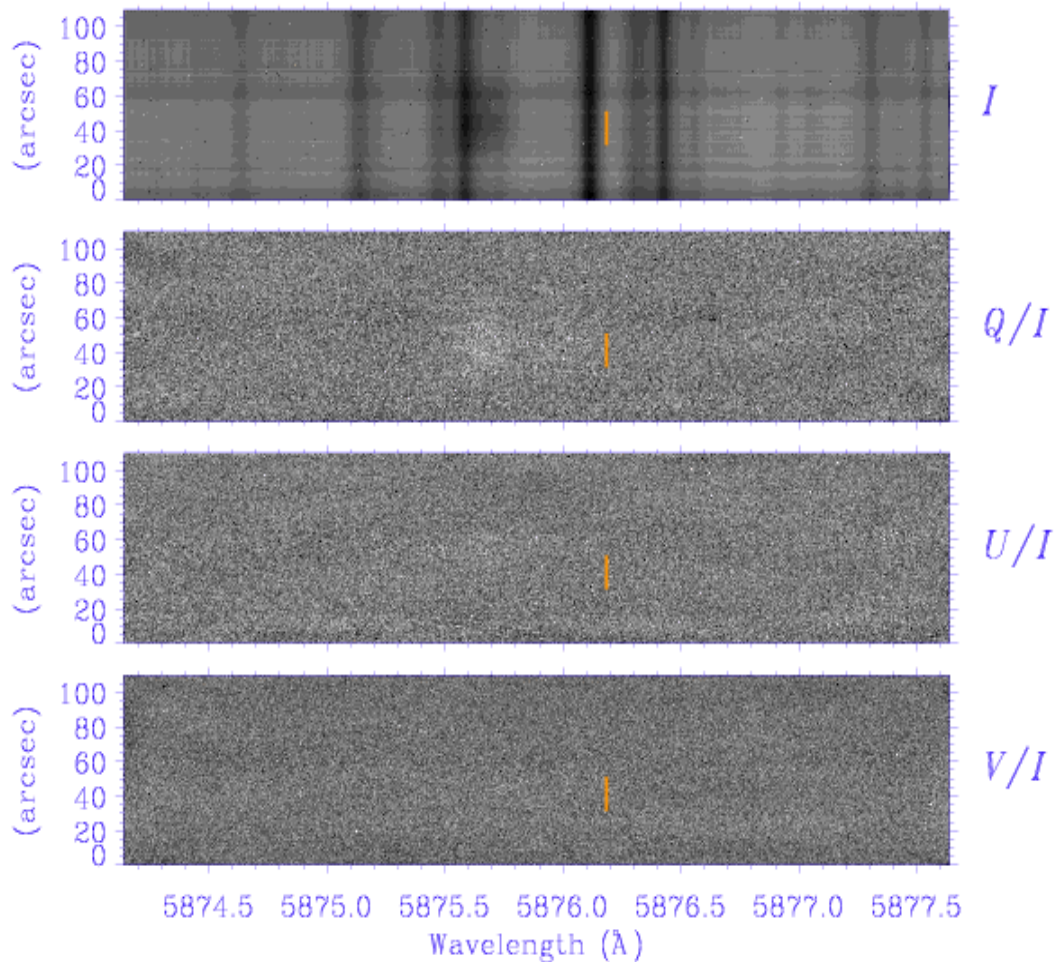


H α disk image

The red line indicates the slit position during the observation

Stokes images

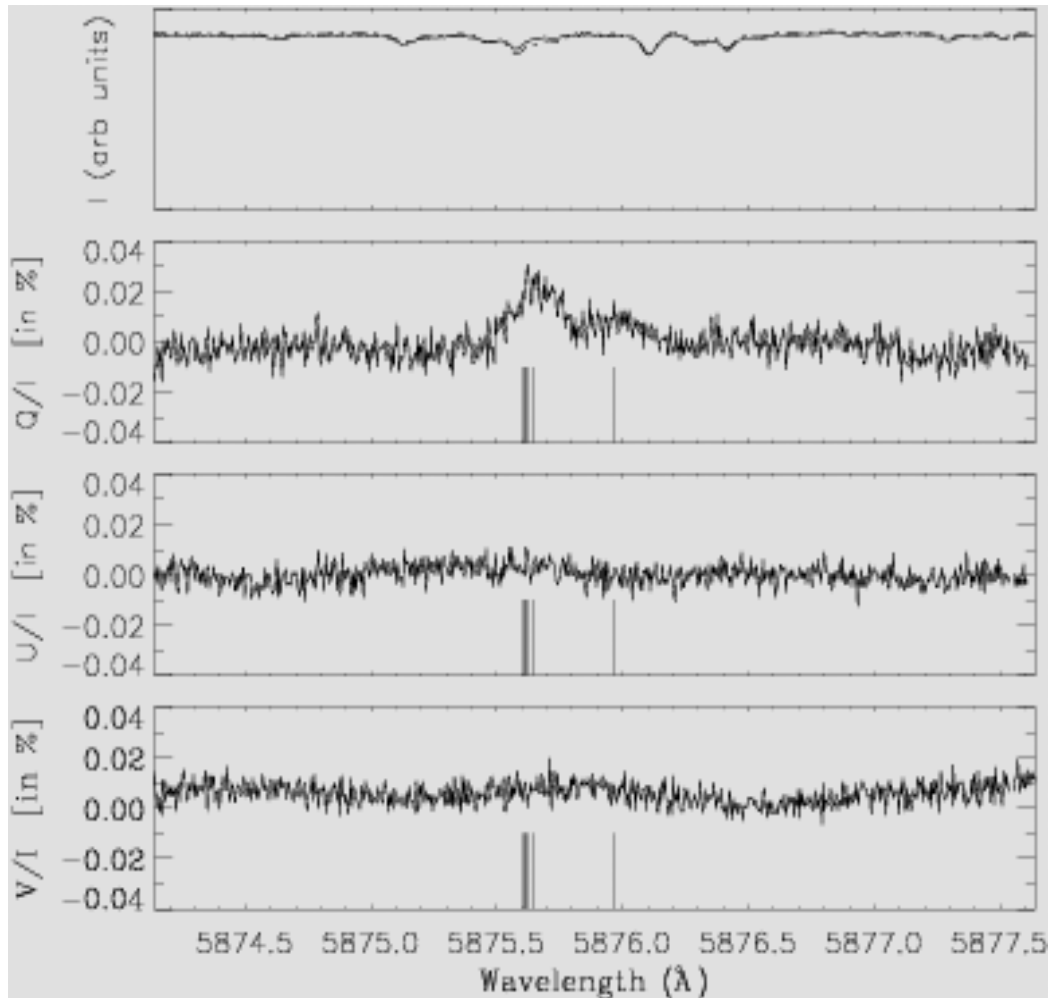
Filament-observation at disk center in D3



Very faint signatures
are seen in the I and Q/I
images

Stokes profiles are
obtained by averaging
along the vertical
orange interval (see
next Figure)

D3 - Stokes profiles in a filament



In the I profile the filament signature is very faint

The positions of the lines of the D3 multiplet are marked

The Q/I profile amplitude is of the order of a few times 10^{-4} . Similar shapes are found also in prominences.

In some other observations no polarization signatures were detected

Conclusions

- In these observations at the solar disc centre we have found:
 - H α : filaments show a Q/I peak in the line centre, while in U/I two peaks are found in the line wings
 - He-D3 line: the polarization signatures, if present, are very faint ($\sim 10^{-4}$), and seem to have similar shapes to those observed in prominences. The Hanle effect in forward scattering due to the inclined magnetic field of the filament plasma can explain these Q/I signals.