Public Kepler Data on the Bright Star θ Cygni

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The Star:

θ Cyg (13 Cyg, KepId = 11918630)
α = 19 36 26.53 δ = 50 13 15.9

F3V main sequence star
V magnitude = 4.5

Brightest star observable with *Kepler*
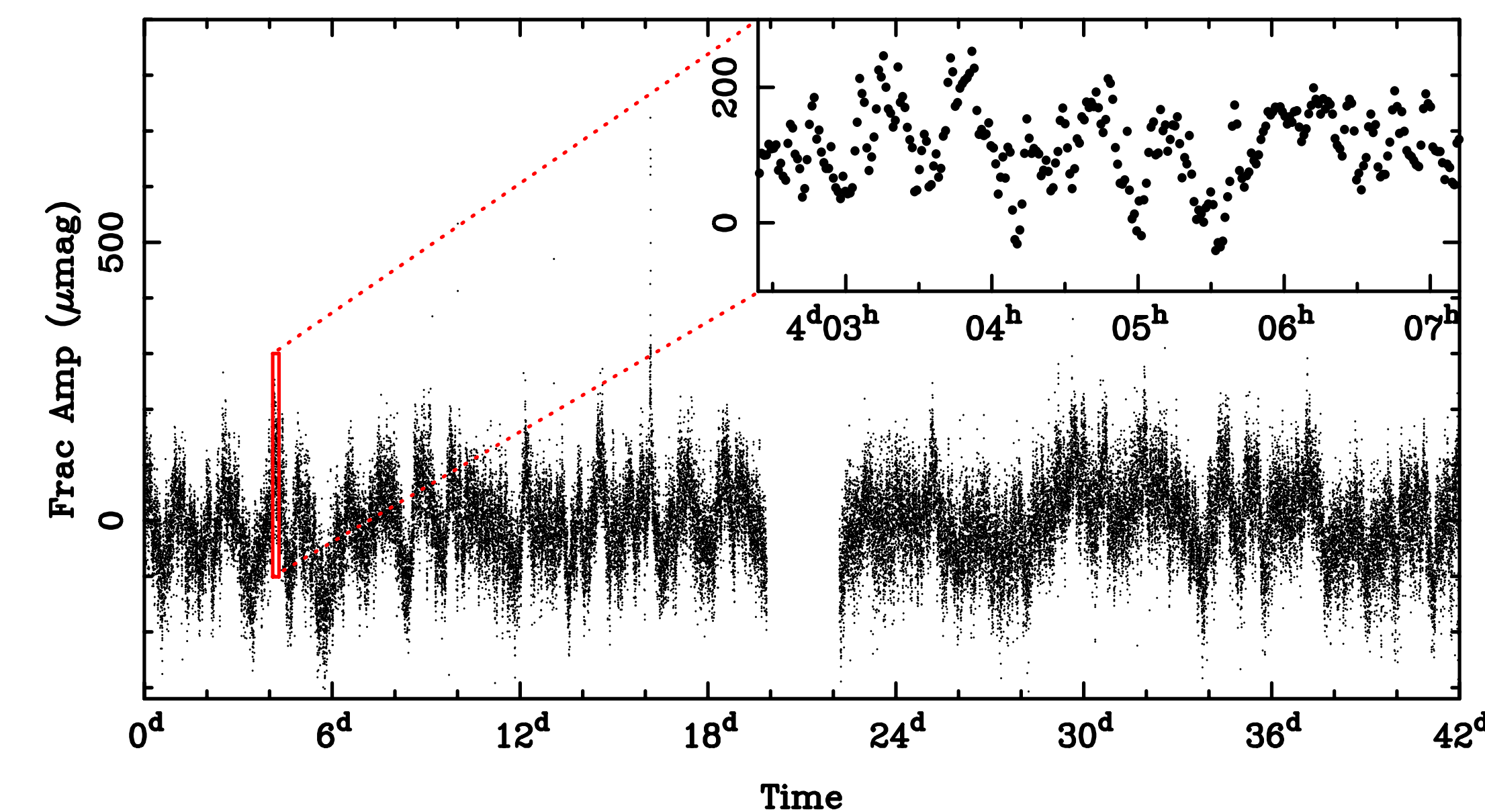(7 magnitudes brighter than saturation limit)

The Data:

245 modes with amplitudes >1.2 μmag detected between 1000-2500 μHz based on preliminary analysis

Noise level competitive with heliosesimology

Lightcurve available at
http://keplergo.arc.nasa.gov/

Target Pixel Files will be made public at http://archive.stsci.edu/kepler
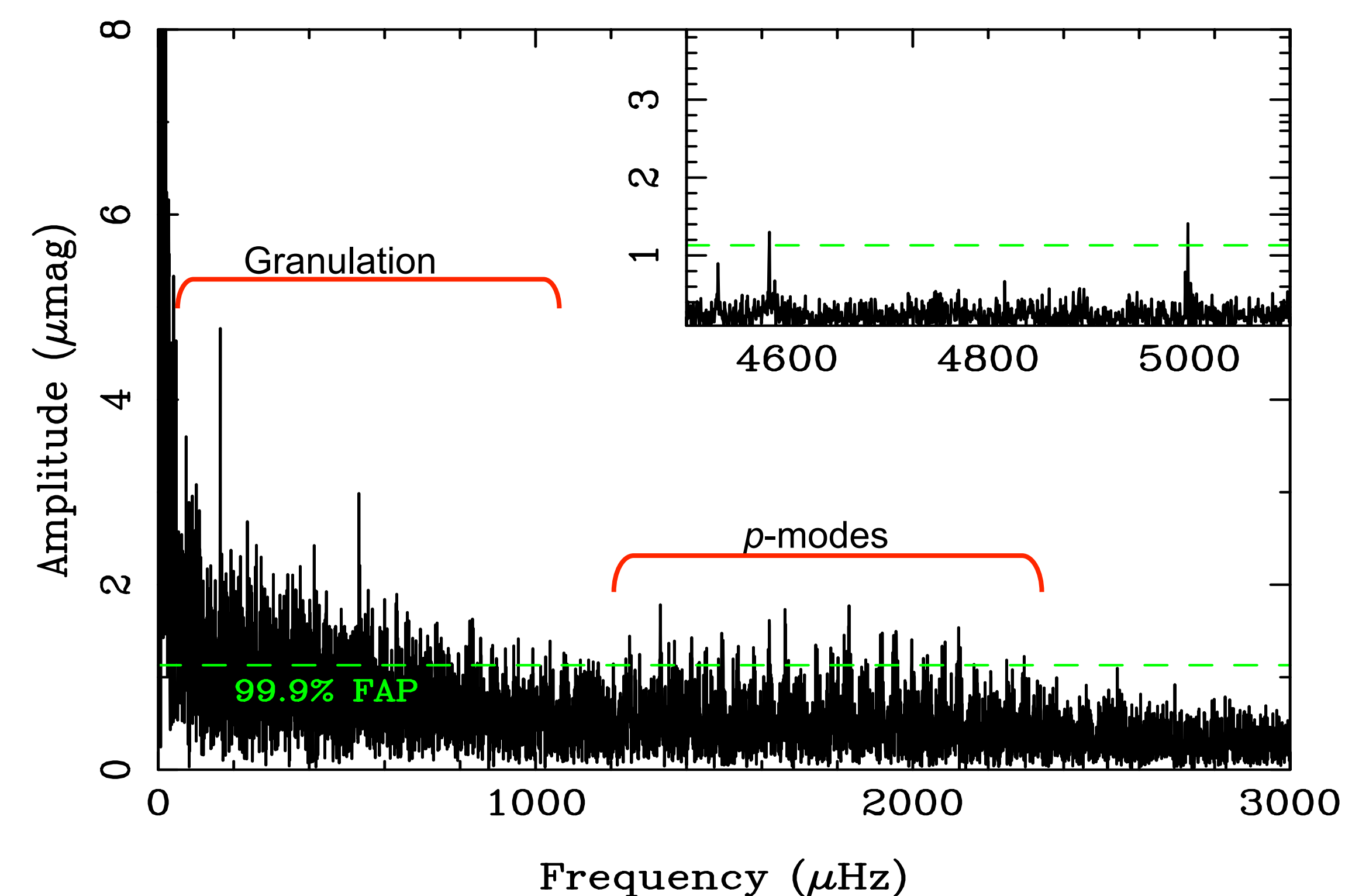Target Pixel Files are described in Poster 140.1 (Thompson et al.) in this session

Observing Bright Stars With *Kepler:*

• Stars are observed with Kepler using one of a set of masks that define the pixels to be stored for that star. For objects V < 8th, these standard masks grow prohibitively large

• Special apertures can be defined that better conform to the psf of extremely saturated bright stars. For θ Cyg, the number of recorded pixels was reduced from >10,000 to ~1,300 by using a special aperture

• **The public may apply** to define a special aperture to observe their own bright target through the Guest Observer (GO) program

• Up to 12 special apertures may be defined for each quarter

• There are 85 stars brighter than 8th magnitude that Kepler can observe. Only 7 have been observed to date

• Due to the technical challenge of creating special masks, observers interested in performing these observations should apply for Director's discretionary time, available quarterly (see http://keplergo.arc.nasa.gov/GOprogramDDT.shtml)

Stars observed with Special Apertures:

CH Cyg	V=8.8 - symbiotic star
θ Cyg	V=4.5 - F4V dwarf
16 Cyg A	V=6.0 - G2 dwarf
16 Cyg B	V=6.2 - G2 dwarf
Trinity star	triple eclipsing binary
RR Lyr	V=7.1
V380 Cyg	V=5.7 - double A star

For more information on observing with *Kepler*, visit our booth at #506-508

42 day lightcurve of nearly continuous 60 second integrations. The inset is a detailed view of the data around 4 days

Fourier Transform of 42 day section of lightcurve. Peaks above the the green dashed line have a <0.01% chance of being due to random noise.
We observe *p*-modes and granulation noise, but no evidence of δ Scuti/γ Doradus type oscillations.
The two peaks at 4600 and 5000 μHz are not consistent with any known *Kepler* artefacts.
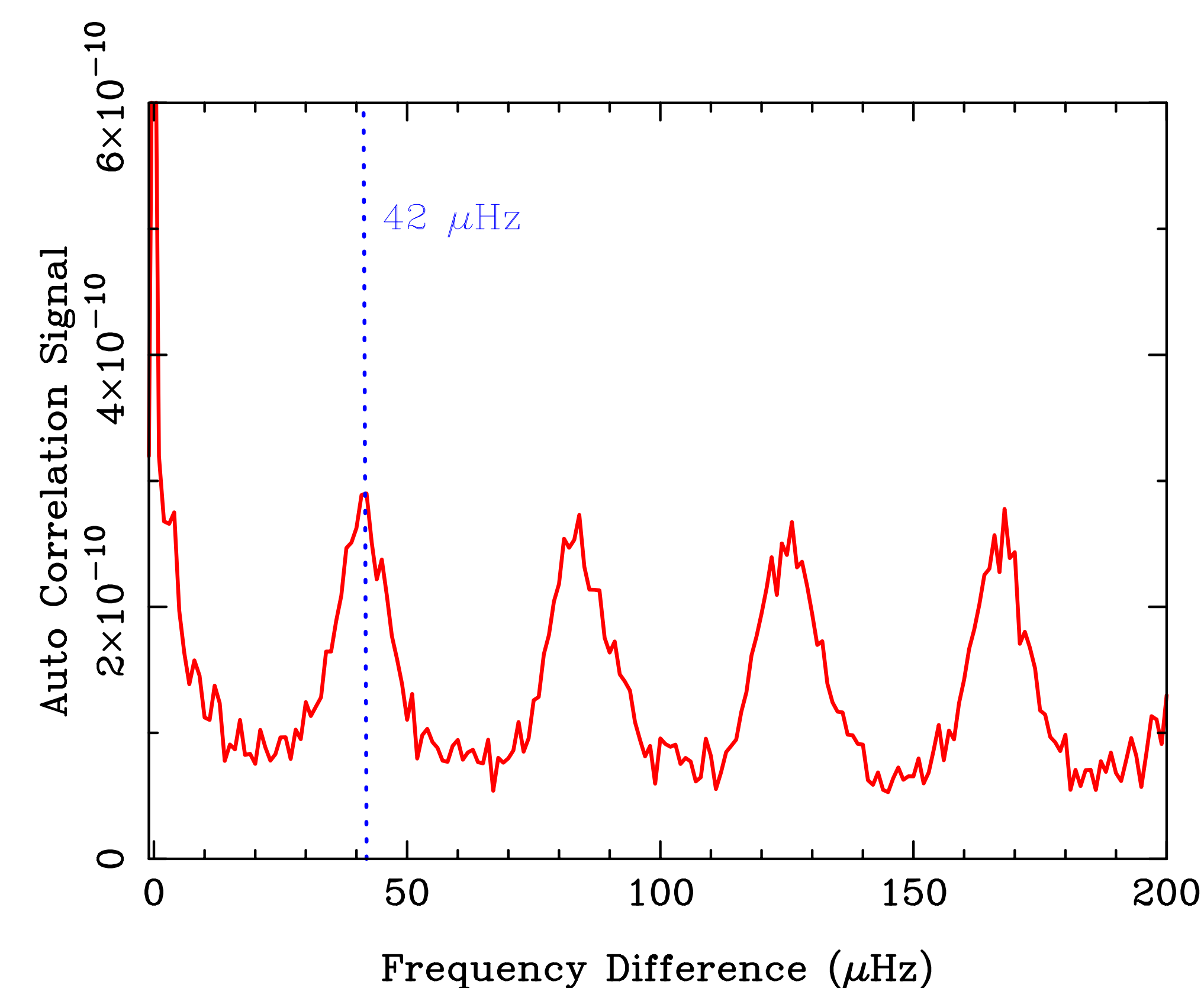
Auto Correlation of the detected peaks, showing strong peaks at multiples of 42 μHz, establishing the primary frequency spacing – a key input parameter to asteroseismological models