

SOAR Observations of Hot DQ White Dwarf Stars



WITH COMMENTS ON THEIR HABITS

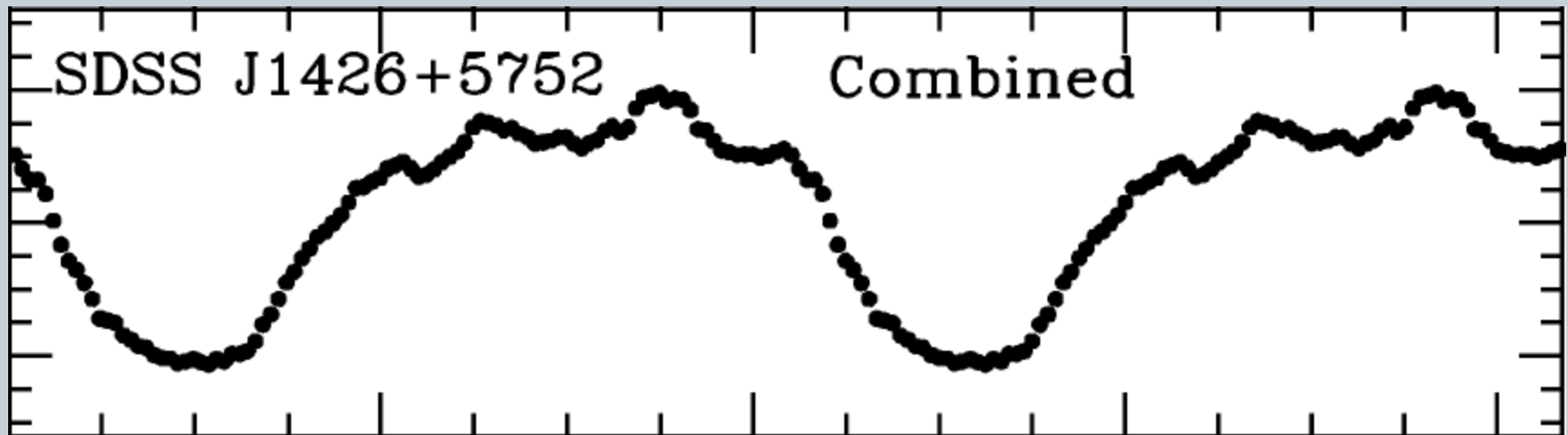
BART DUNLAP
THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL
HILL

AUGUST 16, 2010



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Discovery of a Variable DQ



Period	Amplitude
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418 s	1.6%
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1 st harmonic	0.5%
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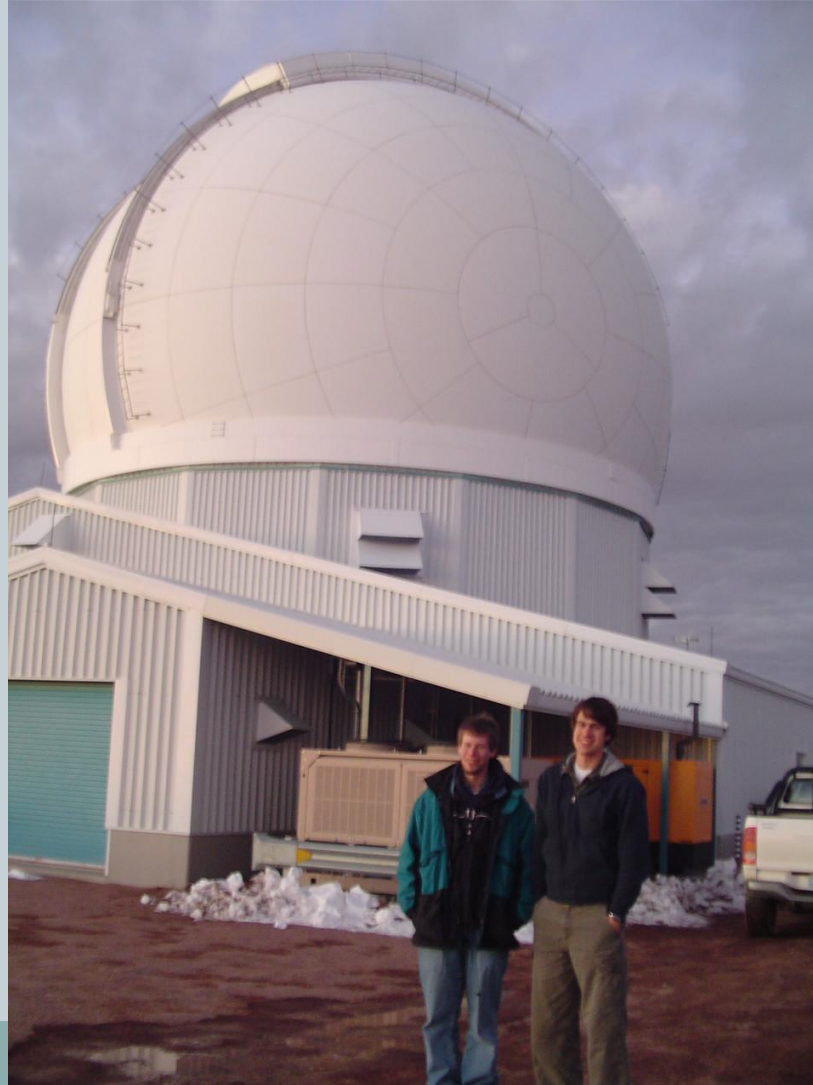
Montgomery et al. 2008

We Went Looking For Another One

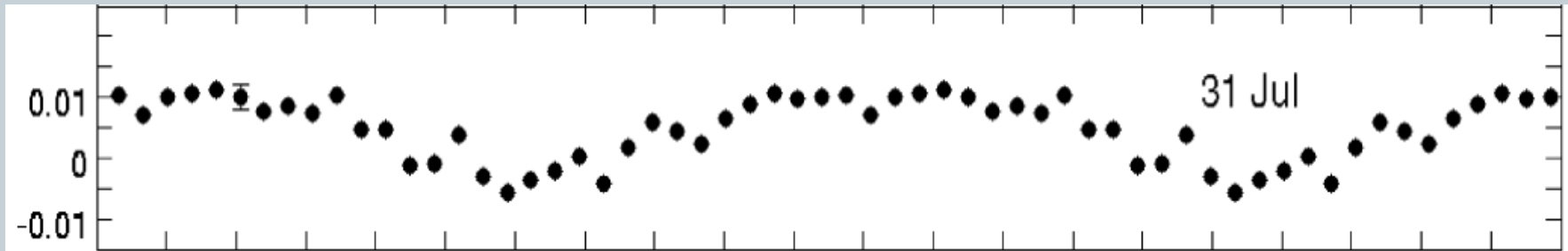
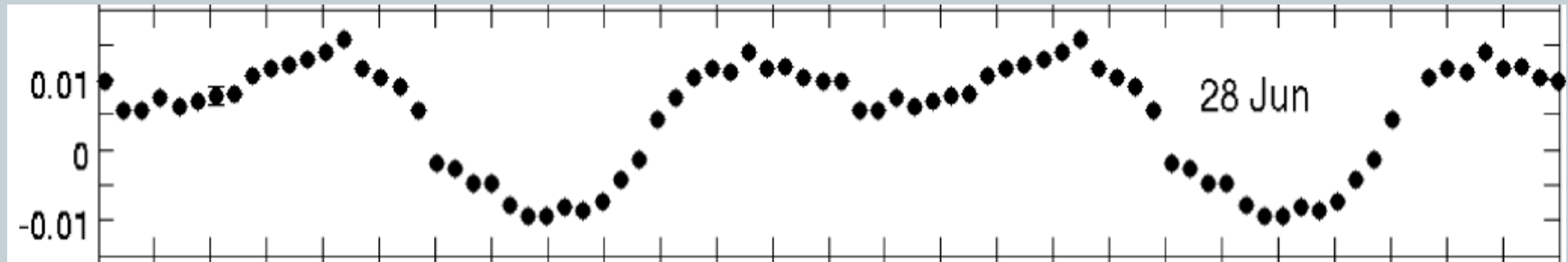


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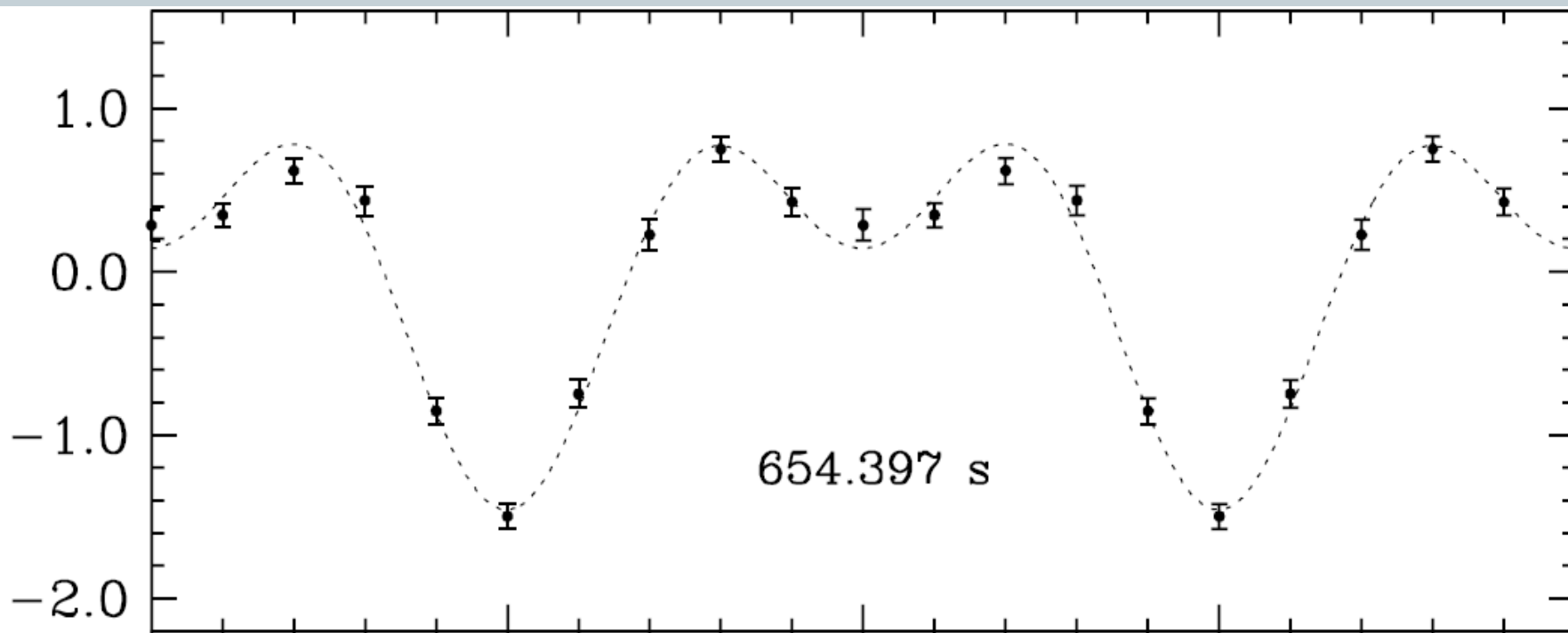
The SOAR Telescope



Two New DQVs



SDSS J2200-0741



Period

Amplitude

654 s

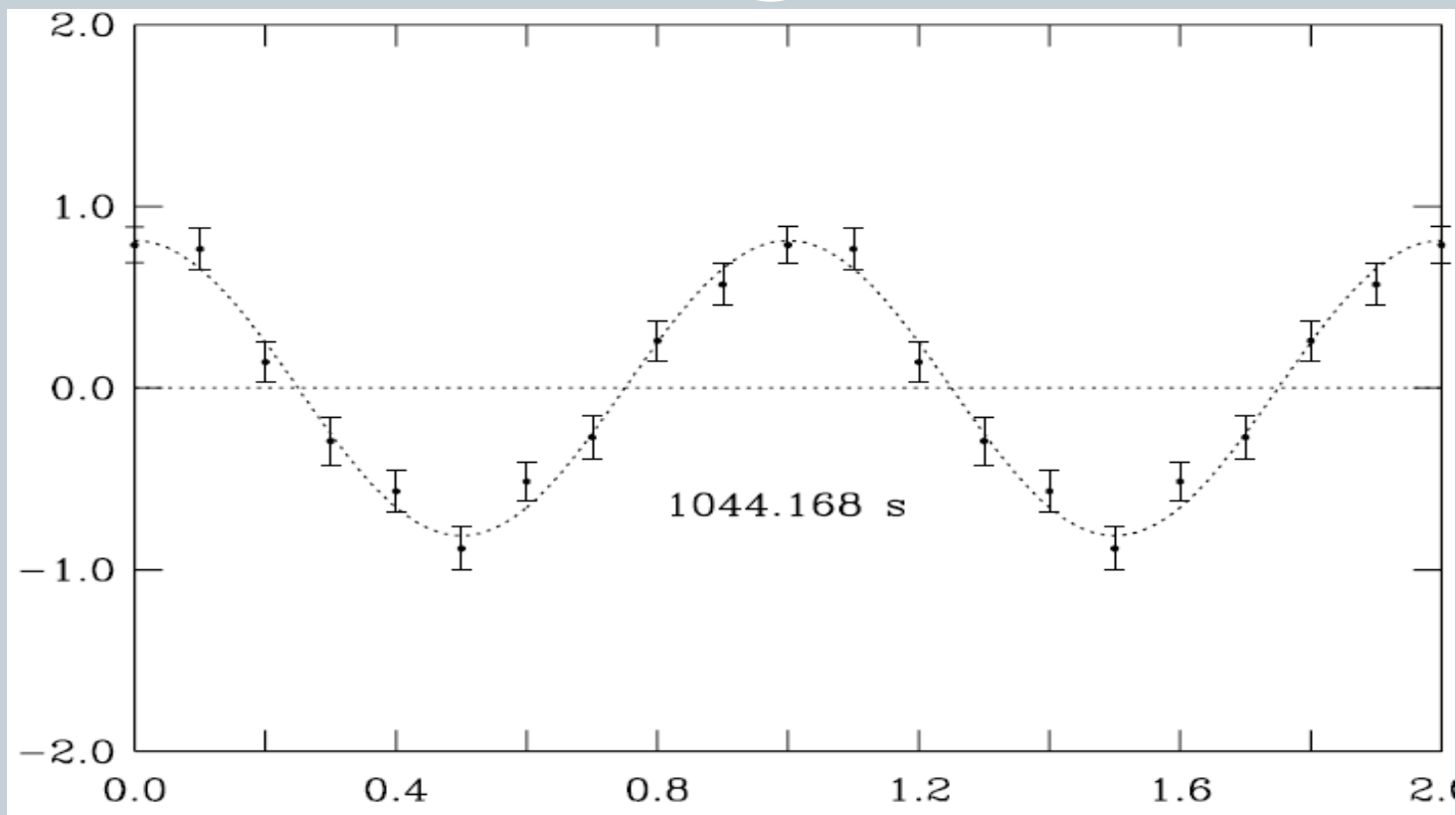
0.8%

1st harmonic

0.8%

Dufour et al. 2009

SDSS J2348-0942



Period

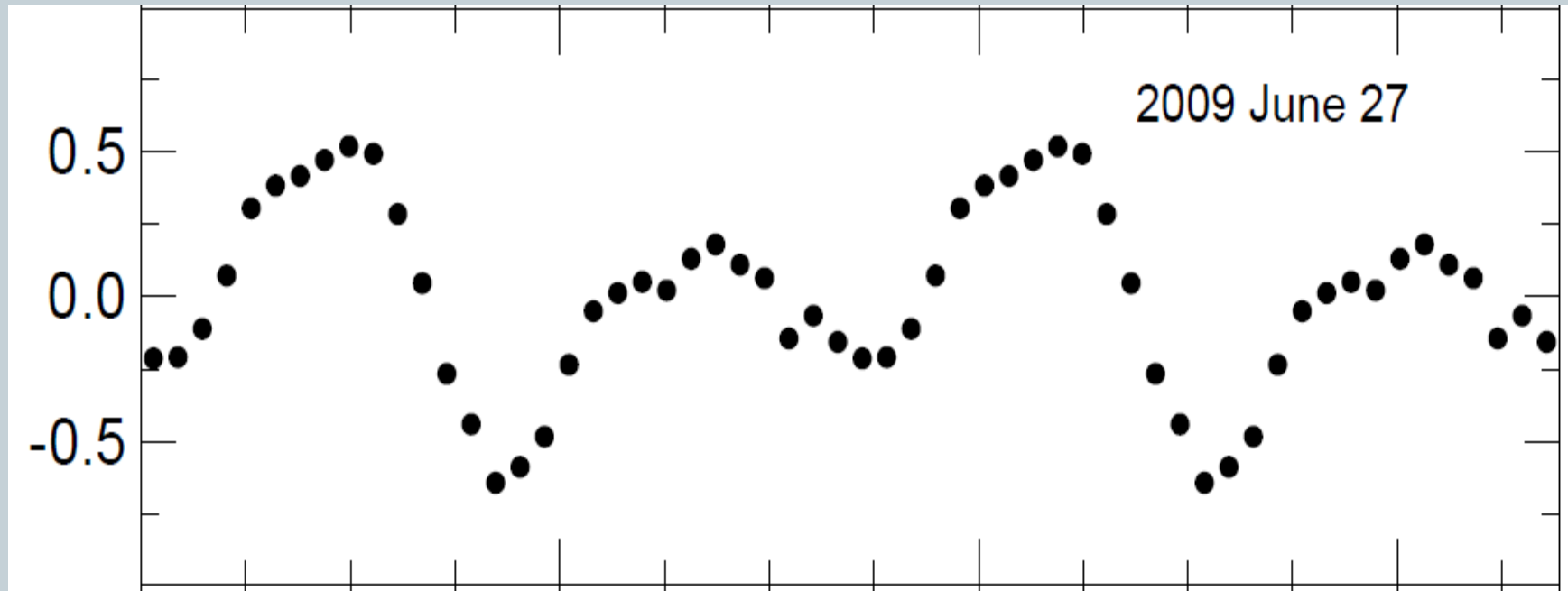
Amplitude

1044 s

0.8%

Dufour et al. 2009

SDSS J1337-0026



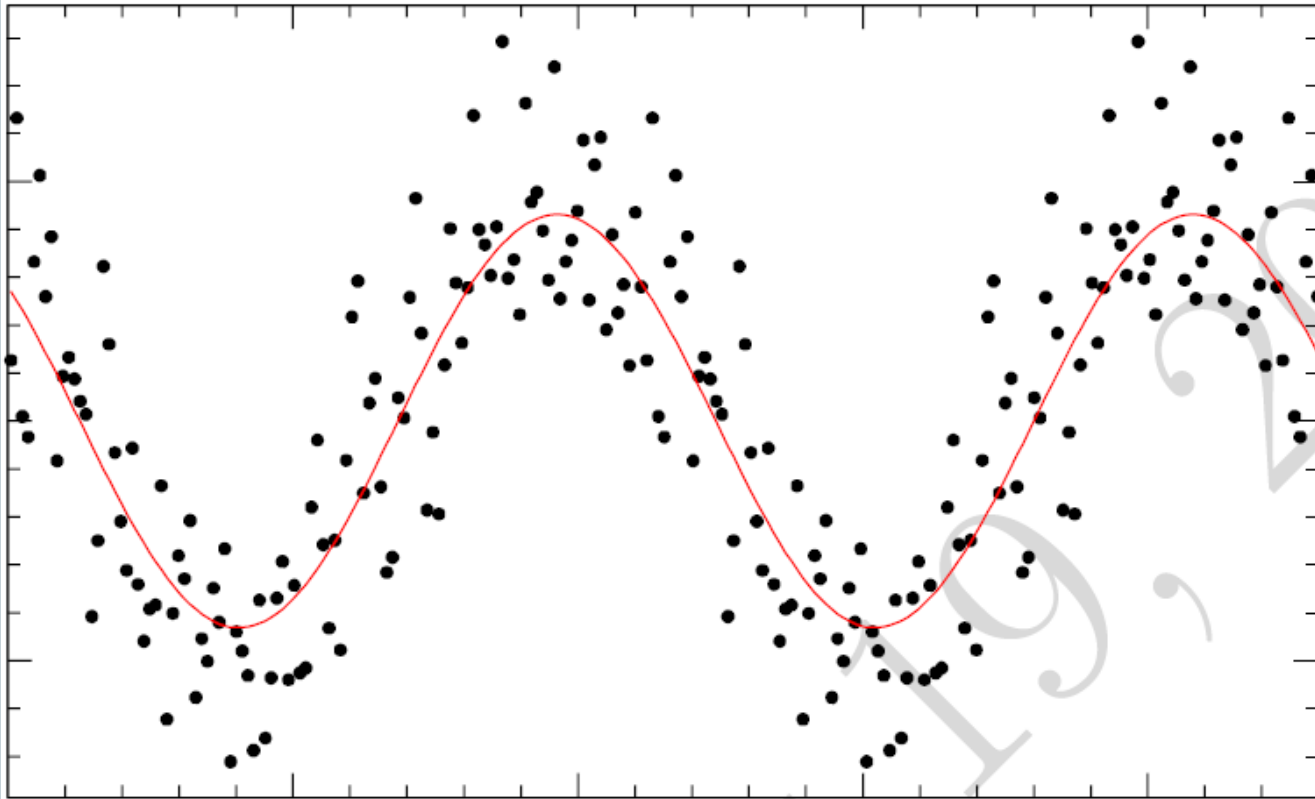
Period	Amplitude
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339 s	0.3%
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1st harmonic	0.3%
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Dunlap et al. 2010

SDSS J1036+6522



Period

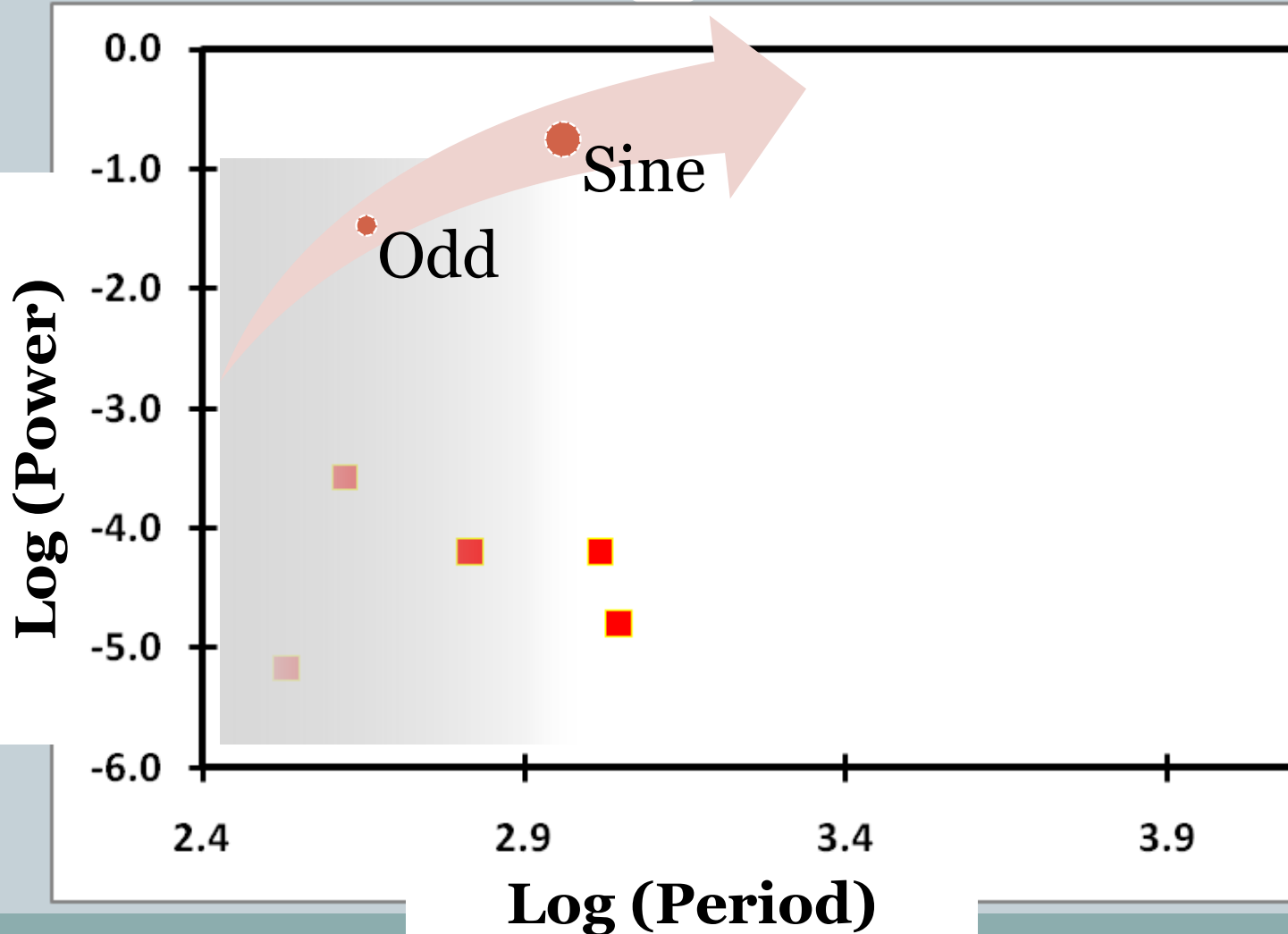
Amplitude

1116 s

0.6%

Williams et al. in preparation

Hot DQV Power vs. Period



Why the odd pulse shapes?



Magnetic

Non-Magnetic

Odd

1426+5752
2200-741



Normal



2348-42



Why the odd pulse shapes?



Magnetic

Non-Magnetic

Odd

1426+5752
2200-741



1337-026



Normal

1036+522



2348-42

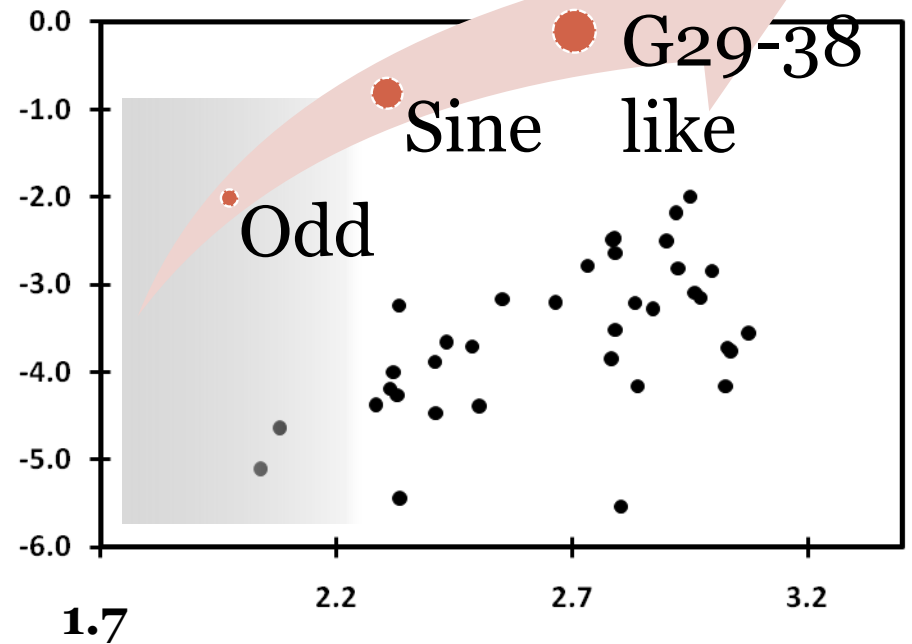
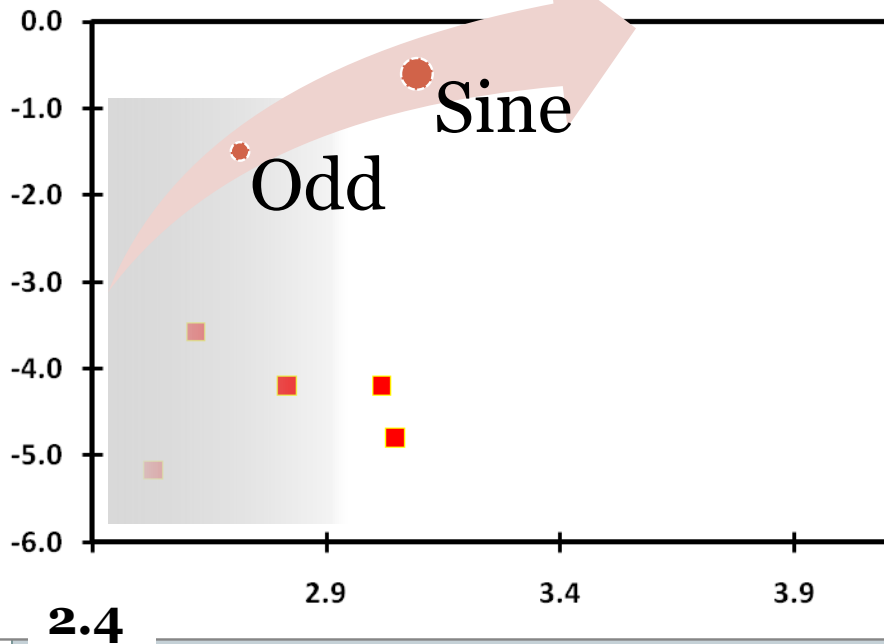


A Fruitful Analogy

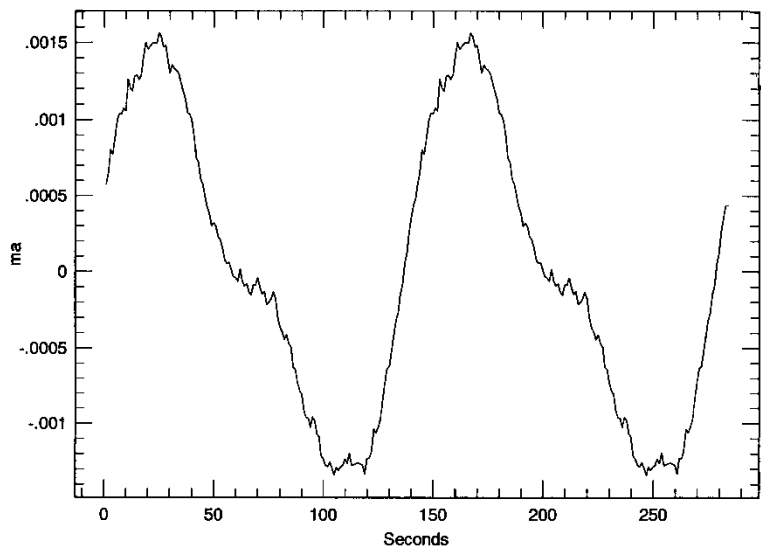


DQVs

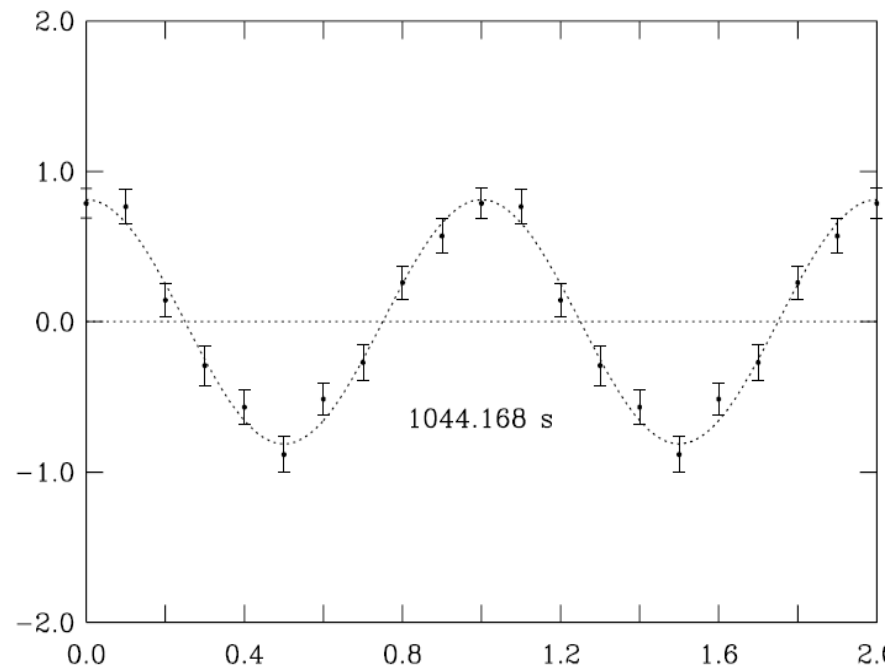
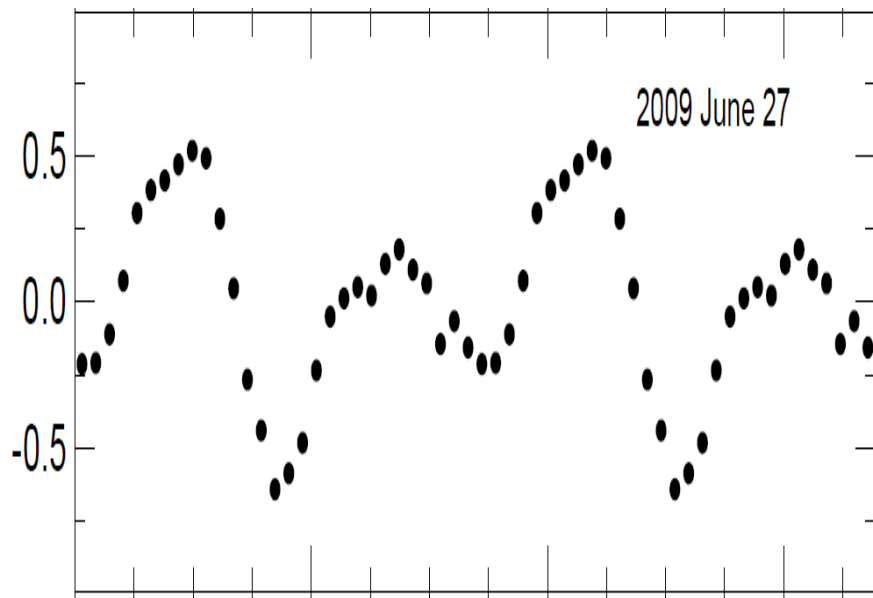
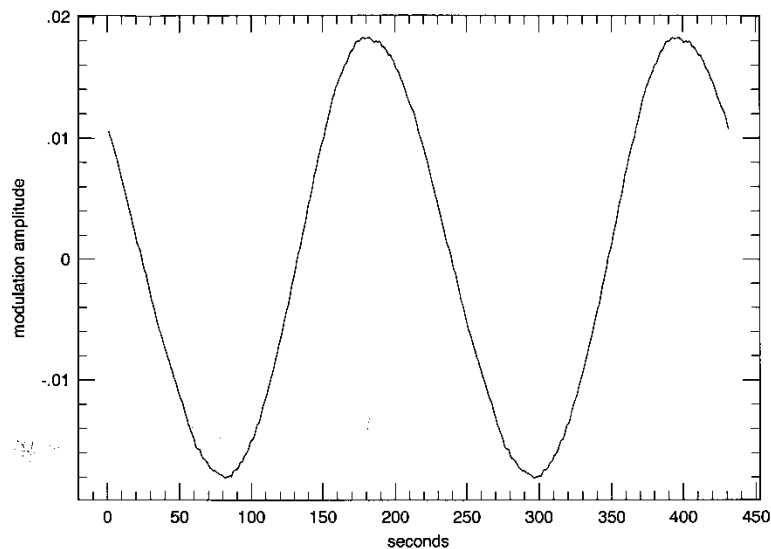
ZZ Cetus



G185-32 (142 s)

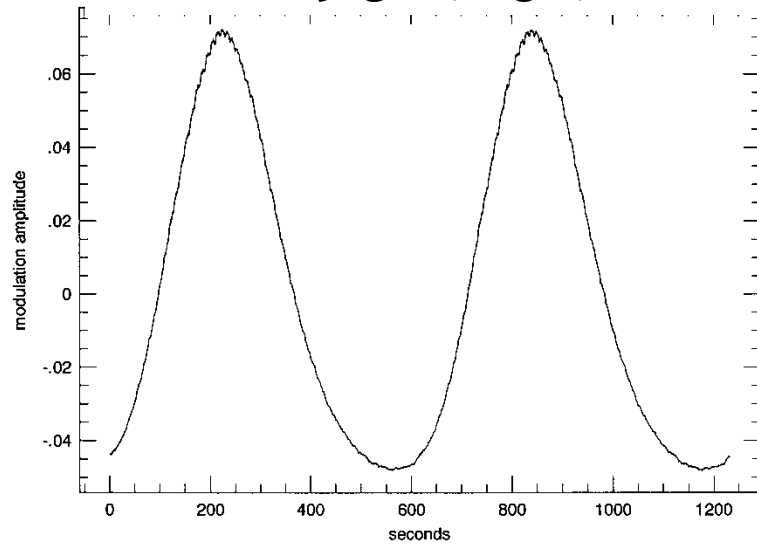


G117-B15A (215 s)



If the Analogy Holds . . .

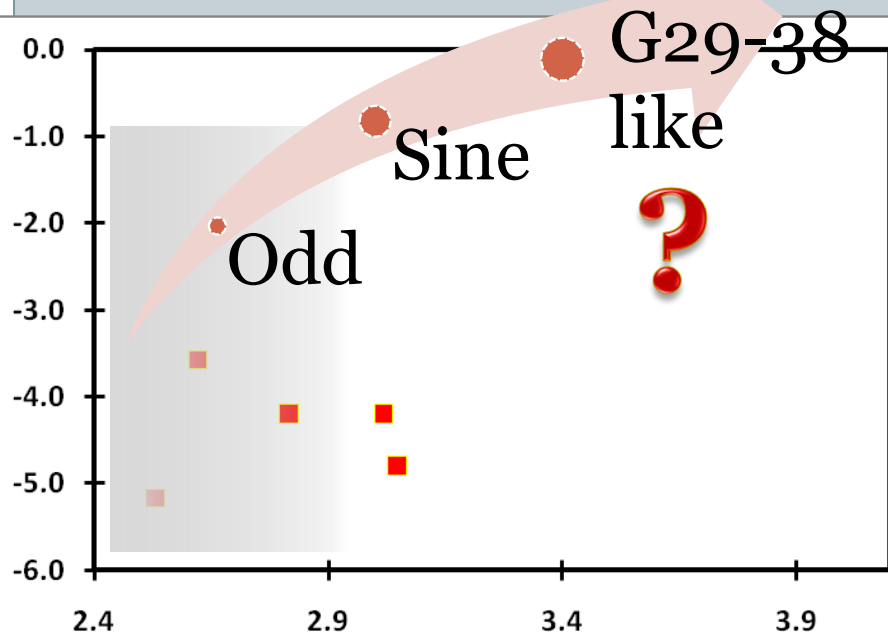
G29-38 (615 s)



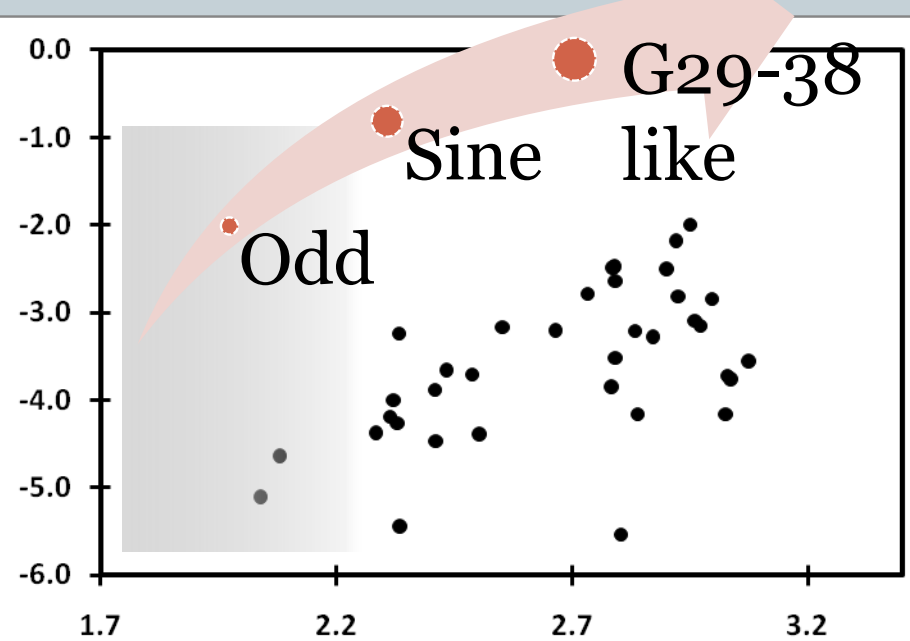
Is there anything out there?



DQVs



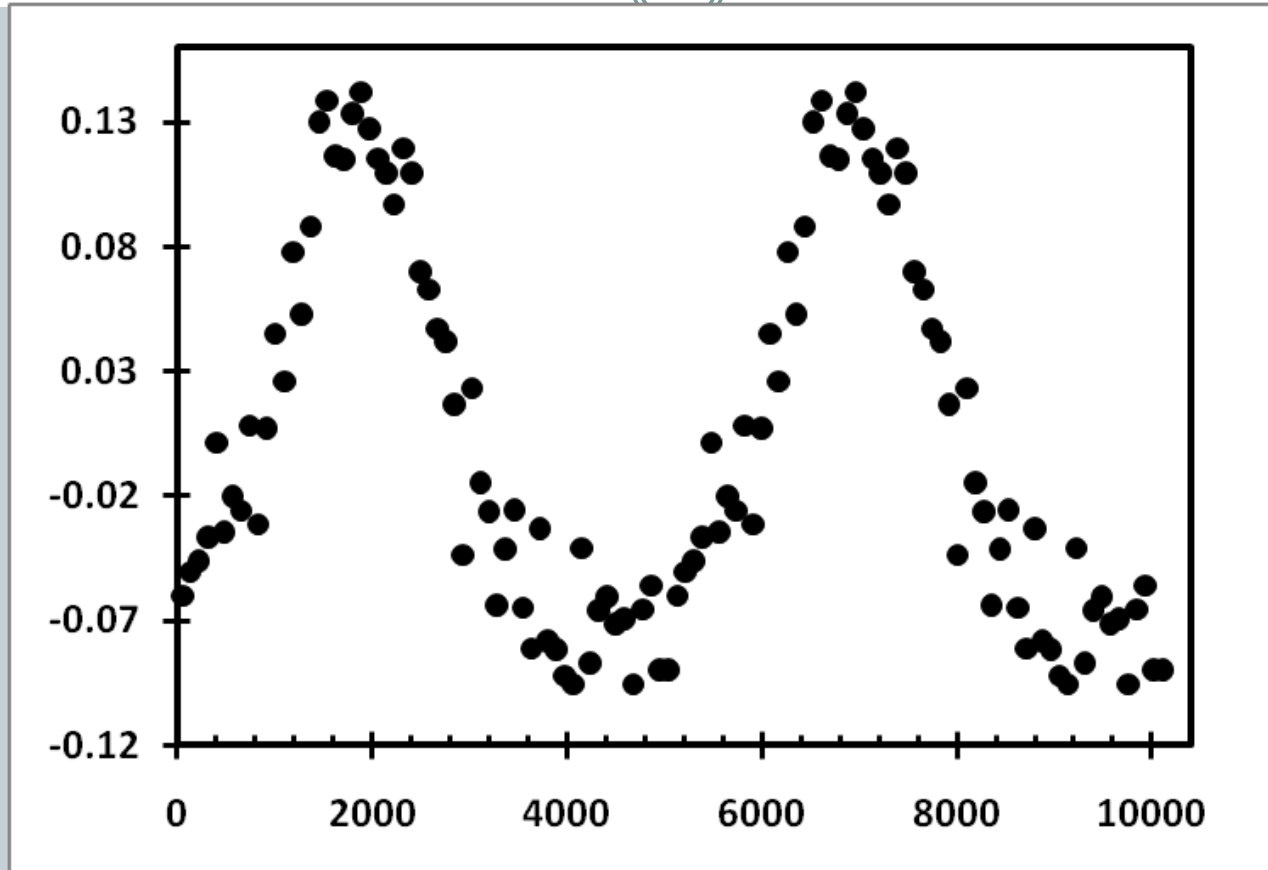
ZZ Cetus



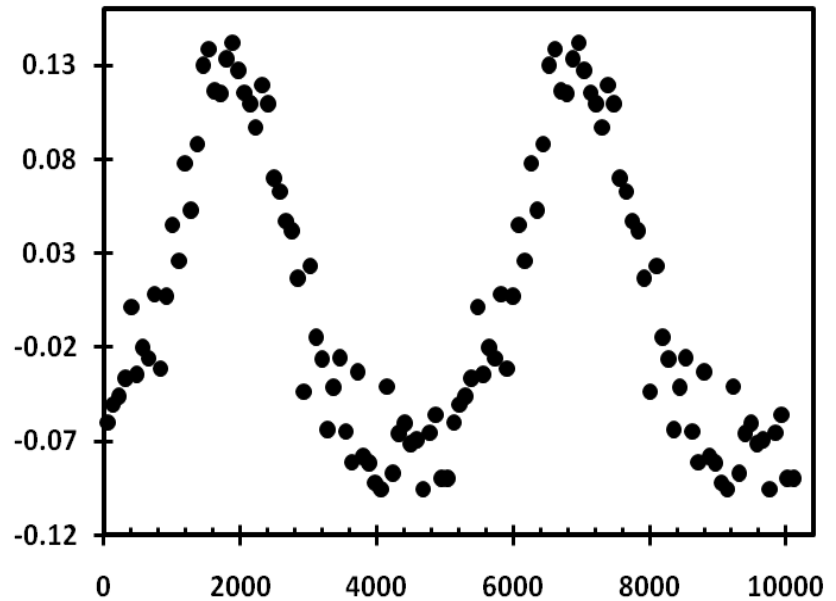
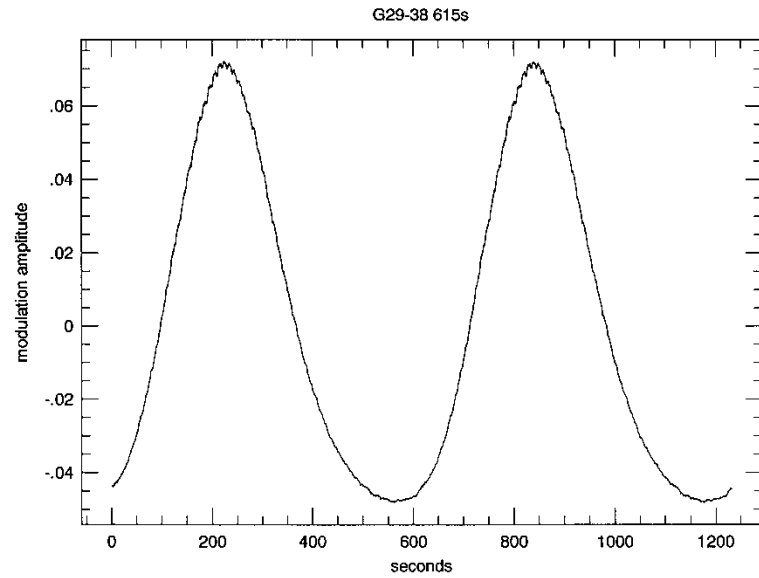


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A Large Amplitude DQV



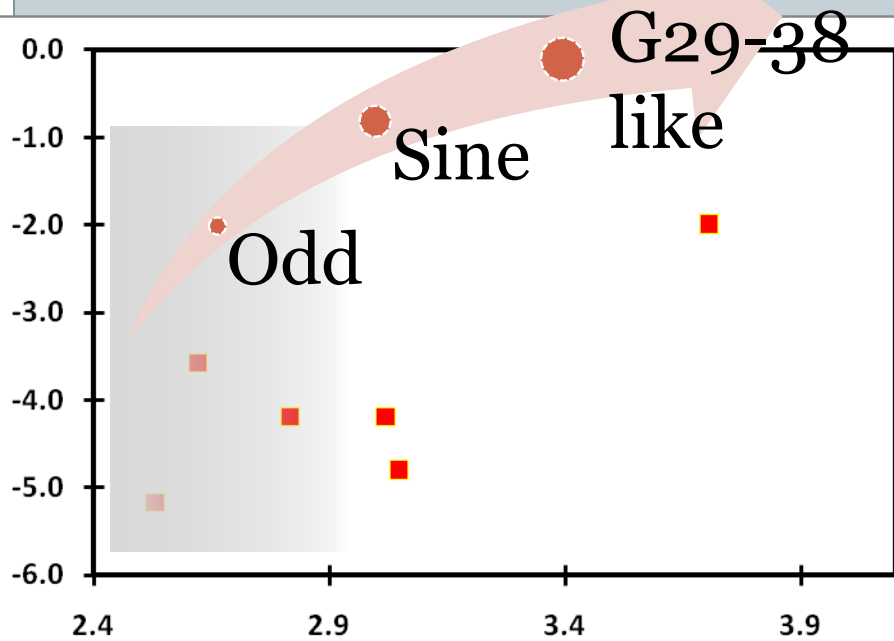
That's Better.



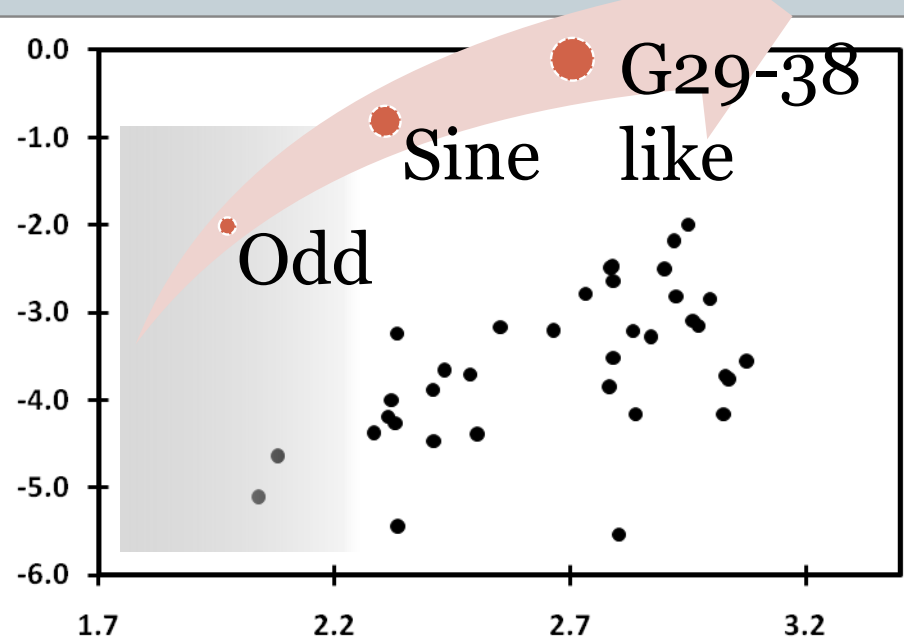
Is there anything out there?



DQVs



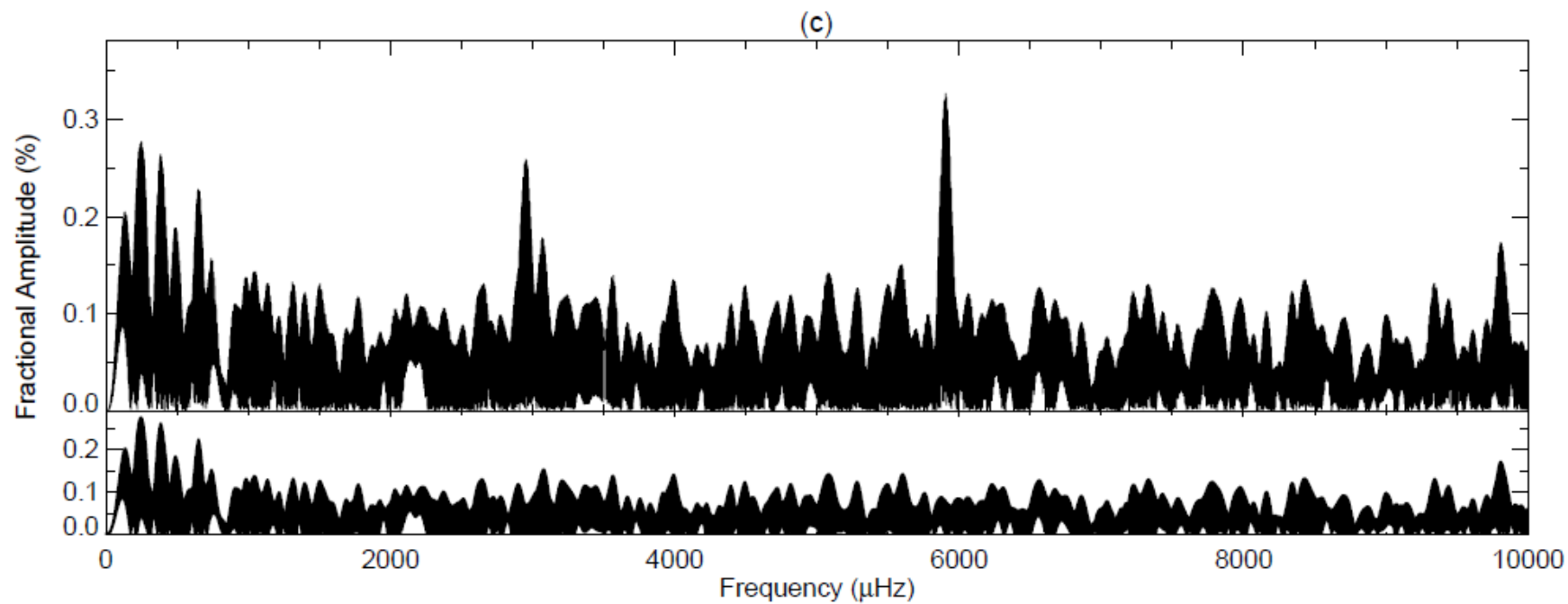
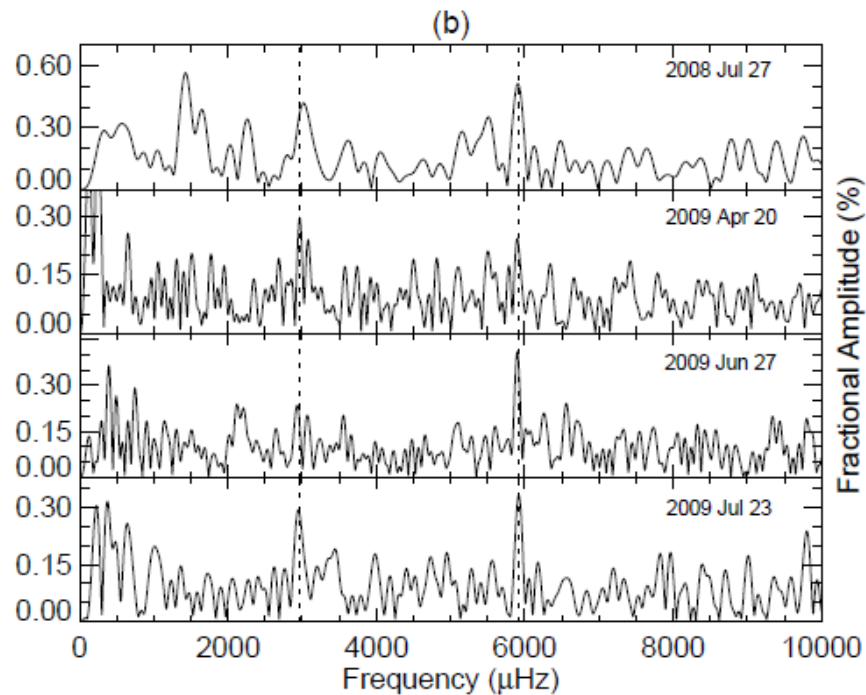
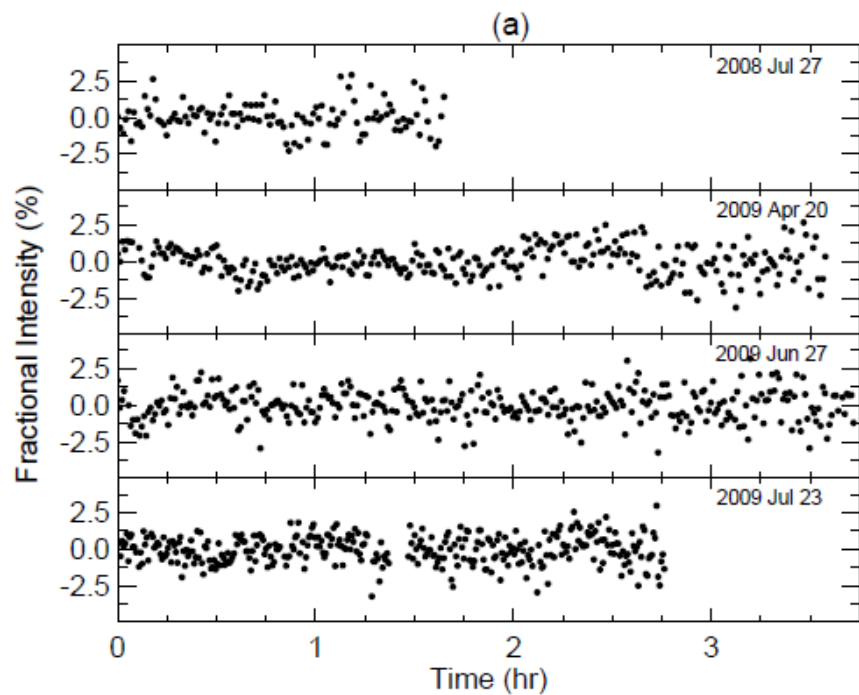
ZZ Cetis



In this story . . .



- The odd pulse shapes result from $l > 1$
 - Chromatic amplitude differences
 - Rotational splitting differences
- Like the short-period DAVs, the short-period DQVs are
 - Lower amplitude
 - More Stable
 - Hotter
- We can expect the converse for the long-period DQVs
- What else? (Audience participation)



DQ Big Spectrum

