

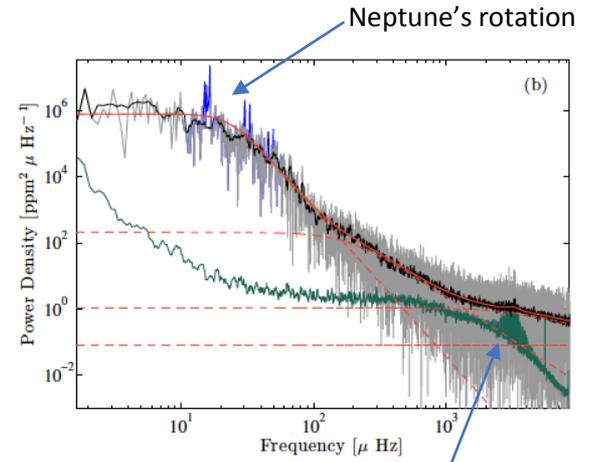
Observing the Sun with a Distant Mirror

What is the science question? Can solar/stellar oscillations be detected in reflected light and what does this tell us?

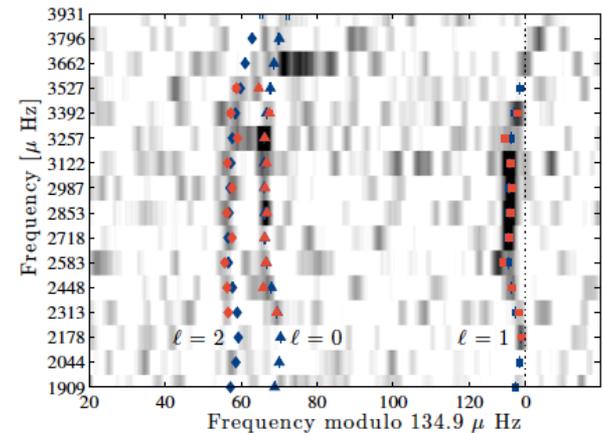
What are the findings? Neptune observations from Kepler in 2015 show the signal of the ~5-minute solar oscillation. Although the data are noisier, the observed oscillation frequencies and widths agree with simultaneous SOHO, VIRGO, SPM, and BiSON data; however, all show the maximum oscillation frequency to be higher than the usual reference value.

What is the impact? This is the first detection of solar oscillations in *reflected* light. It also shows that the observed max. frequency can be variable, biasing predictions of stellar mass and radius (using standard scaling relations gives a mass of $1.14 \pm 0.06 M_{\odot}$ and radius of $1.05 \pm 0.02 R_{\odot}$).

Why does it matter to non-scientists? It is difficult to directly measure the properties of other stars, so we rely on indirect methods and scaling relations to the Sun to estimate them; estimates can be improved with more observational data to account for variability.



Kepler (black) and VIRGO data (green) show the signal of solar oscillations



Kepler (red) and BiSON (blue) observed frequencies