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# What asteroseismology can do for exoplanets: the case of the bright multiple system Kepler-410

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## Abstract

I present the validation and characterization of Kepler-410. Despite its brightness ( $V = 9.4$ ) and its identification as a planetary candidate at the beginning of the Kepler mission, this system still awaited its confirmation. This is because of the small (2.8 R<sub>Earth</sub>) and presumably low-mass planet candidate, its long orbit ( $P = 17.8$  days), and the presence of a second star in the system. The system also shows transit timing variations. Using asteroseismology as well as a variety of data from space and ground based observatories, we were able to confirm the planetary nature of the system. We further determined a number of system properties, including the stellar inclination and planetary eccentricity. Both of these parameters could only be determined through the use of asteroseismology. Kepler-410 has an inclination of  $82.5 [+7.5, -2.5]$  degrees indicative of a low stellar obliquity, and a non-circular orbit with an eccentricity of  $0.17 \pm 0.07$ . I will close the talk by presenting new asteroseismic eccentricity determinations in other multi-planet systems harboring low mass planets.

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