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Editorial: Asteroseismology in the Kepler Era

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Editorial on the Research Topic

Asteroseismology in the Kepler Era

The Kepler spacecraft, launched by the National Aeronautics and Space Administration (NASA) on 2009 March 7th, proved to be an important pioneering astronomical survey instrumental, making crucial discoveries during its primary mission over the ensuing 4 years. Looking longitudinally along the Local Spiral Arm in the general direction of Cygnus maximised the number of nearby (and therefore bright) stars that could be monitored almost continuously over the lifetime of the mission. A 0.95-m mirror with detectors sensitive to wavelengths in range 430–890 nm offered the best prospect of detecting earth-sized planets with orbital periods of about one-year, transiting across the disks of solar-type stars. While the search for planets orbiting nearby stars, and those in habitable zones in particular, persuaded NASA to support the Kepler mission, it would be a mistake to suppose that asteroseismic studies constituted a secondary scientific objective. Stellar pulsation generates light-curve features which could be of the same order as the flux lost from a solar-type star when an earth-sized planet in its habitable zone transits across its disk; it is critical that the two are not confused. Asteroseismology therefore plays a role in the search for planets beyond the Solar System. Furthermore, the existence of a planetary system is likely to affect evolution and internal structure of the host star, thereby determining its asteroseismic properties. Searches for planets orbiting nearby stars, and asteroseismology of these objects, are therefore inextricably linked.

The Editors are extremely grateful to the authors and reviewers who have contributed papers on asteroseismology with the Kepler spacecraft. While only a tiny fraction of the scientific returns are presented, the sample is understood to be representative and serve to inspire and support future space missions which will achieve even more than the impressive results secured by the Kepler mission.

In particular, we look forward to theoretical developments which allow the full potential of asteroseismic observations to be realised.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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