

## Kepler Listens to an Orchestra of Solar-Type Stars

Posted on Thursday 7th April 2011

An international team of asteroseismologists, led by the University of Birmingham, has used data from the NASA Kepler Mission to sample the 'stellar music' of 500 stars similar to the Sun, according to research published today (7 April 2011) in the journal Science. The team used the information from these natural resonances, which is coded in pulses of starlight, to measure the properties of the stars and will now be able to compare their findings with predictions based on models of the Milky Way galaxy.

The Kepler spacecraft is monitoring the brightness of more than 150,000 stars in the Cygnus – Lyrae constellations of our galaxy. Its data are being used to search for planets and also to monitor the natural oscillations of the stars, the field of asteroseismology. The oscillations lead to miniscule changes or pulses in brightness, and are caused by sound trapped inside the stars.

Dr Bill Chaplin from the University of Birmingham's School of Physics and Astronomy, who leads the international collaboration, said, 'The sound inside the stars makes them ring or vibrate like musical instruments. If you measure the pitch of the notes produced by an instrument it can tell you how big the instrument is. The bigger the instrument is, the lower the pitch and deeper the sound. This is how we can tell how big a star is - from its stellar music.'

He continued, 'Thanks to the Kepler Mission we can measure and weigh the stars and look at the range of sizes and masses. Previously astronomers have predicted the population of stars in the Milky Way by creating computer models of the stars and planets. It has been difficult to verify aspects of these models in great detail due to lack of data and levels of precision. We now have the tools to be able to test and interrogate the models in much more detail than we could before, to build an accurate picture of star populations in our galaxy.'

The team, which is part of one of the biggest international collaborations in astronomy, the Kepler Asteroseismic Science Consortium (KASC), found 500 stars that ring like the Sun. Dr Hans Kjeldsen from Aarhus, who coordinates KASC, said 'Before Kepler we had asteroseismic data on only about 20 such stars. We now have an orchestra of stars to play with, and this opens up huge possibilities for probing stellar evolution and obtaining a clearer picture of the past and future of our own Sun and how our galaxy, and others like it, has evolved over time. We can, for example, pick out stars that weigh the same as the Sun but have different ages, to, in effect, follow the Sun in time...'



visible manifestation of sound waves trapped in the stellar interiors. Credit: Gabriel Perez Diaz, Instituto de Astrofisica de Canarias (MultiMedia Service).

### Notes to Editors

1. The paper will be featured in the 8 April issue of the journal Science entitled 'Ensemble Asteroseismology of Solar-Type Stars with the NASA Kepler Mission.'
2. Sound files of the stars, images and a short movie are also available. Please call the press office as below.
3. The Kepler Mission was launched in March 2009 and is monitoring the brightness of more than 150,000 stars in the Cygnus – Lyrae constellations of our own galaxy to search for planets orbiting those stars, and to monitor their oscillations (asteroseismology).
4. The asteroseismology research is being undertaken by the Kepler Asteroseismic Science Consortium, an international collaboration of more than 500 scientists. For more information about them visit: <http://astro.phys.au.dk/KASC/> (<http://astro.phys.au.dk/KASC/>)

For more information about the Kepler Mission, visit: <http://www.nasa.gov/kepler> (<http://www.nasa.gov/kepler>)

### For further information

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