Singing stars give away their age

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Asteroseismologists from the University of Birmingham have studied a star in our galaxy, the Milky Way, which is older and bigger than our Sun and has certain characteristics that signify its age and internal properties, according to a paper in the Astrophysical Journal, announced at a NASA press conference today, Tuesday 26th October 2010, in Aarhus, Denmark.

Scientists are using observations made by the NASA Kepler satellite, which is searching for planets around other stars in our galaxy, to also take the 'pulse' of the stars.

Stars are characterized using the natural pulse of their light waves. These variations in brightness can be translated into ringing vibrations, or oscillations, within the stars using a technique called asteroseismology. The oscillations reveal information about the internal structure of the stars, in much the same way that seismologists use earthquakes to probe the Earth's interior. This information allows the properties of stars, such as their mass, size and age, to be measured to exquisite precision.

The asteroseismologists at Birmingham are part of a team that studied in detail the star KIC11026764, which they have named 'Gemma'. Gemma is about twice the size of the Sun. Interesting signatures from its oscillations signify that Gemma is in late middle age, almost a billion years older than the Sun. Scientists were able to measure the age to an unprecedented level of precision, near one per cent.

Dr Bill Chaplin, Reader in Solar and Stellar Physics from the University of Birmingham's School of Physics and Astronomy, who leads the international team studying solar-type stars, said, 'Stars ring or vibrate like musical instruments. If you measure the pitch of an instrument, you can tell how big it is - the bigger the instrument, the lower the pitch and deeper the sound. This is how we can tell how big stars are. We can also estimate their ages. We find that as stars get older, they go through a state where they become less 'tuneful', and Gemma is in this state.'

He continues: 'We hope that by studying stars in this way it will also give us a greater understanding of the Sun, what drives the variability of the Sun, and why it has quiet and active periods. We can study stars that look like the Sun but are older and younger. This could give us an idea of what might have caused the unusual solar minimum in recent years, when the sun was much quieter than we would have expected it to be.'

Notes to Editors

1. This research will be featured in the Nov 1 2010 issue of Astrophysical Journal: 'A precise asteroseismic age and radius for the evolved sun-like star KIC11026764.'
2. Further papers about 'Red Giants' featuring authors from the University of Birmingham are being presented at NASA's press conference. Red Giants are very old stars that have expanded and cooled as they age. The Sun will eventually become a red giant. The study of red giants plays an important role in understanding how the chemical make-up in our galaxy is evolving over time. These papers are: 'Asteroseismology of red giants from the first four months of Kepler data' (Astrophysical Journal); 'Global oscillation parameters for 800 stars' and 'Solar-like oscillations in red giants observed with Kepler: Comparison of global oscillation parameters from different methods' (both Astronomy and Astrophysics).
3. The Kepler mission was launched in March 2009. It is focussed on the constellations of Cygnus and Lyra, looking at 150,000 stars in total in the Milky Way Galaxy. It is searching for planets around other stars, and studying stars using their oscillations.

Further information
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