

# Clues to stellar evolution revealed in Red Giants' core

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Birmingham asteroseismologists have been studying approximately 600 red giant stars and have been able to distinguish between those that burn hydrogen and those that are burning helium in their cores, according to research published in the journal Nature.

Red giants are stars that are nearing the end of their life. They have expanded to many times their original size, are cooler in temperature and redder in appearance.

As their evolution continues they exhaust their supply of hydrogen at their cores and instead, burn hydrogen in the surrounding shell. They then start to burn helium in their core.

Scientists, up until now, have not been able to distinguish between red giants that have started burning helium and those that are still on their way to that state and are having to rely on burning hydrogen in a shell around the core as their source of energy. Using data from the NASA Kepler mission the scientists are seeing, for the first time, the vibrations in red giants – the signature tune of the interior of the stars – which tell them whether the star is still burning hydrogen or whether it is more advanced in its evolution and is burning helium at its core. This understanding allows us to have a much better idea of the changes we can expect in the behaviour of our own Sun as it ages.

Professor Yvonne Elsworth, asteroseismologist from our School of Physics and Astronomy, said, *'We are getting a real observational handle on the interior of red giants due to the detection of G mode patterns. We are gleaning new information on the internal state of these stars. We can now test the theorists' models of the stars' internal structures. This has the potential to change what we think we know about stellar evolution.'*