Systematic detection of core magnetic fields in red giants with asteroseismology

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Asteroseismology has demonstrated the need for additional mechanisms of angular momentum transport to account for the observed rotation profile in stellar interiors. One of the most promising candidate being magnetic fields in stellar cores. Recently, asteroseismic detections of magnetic fields have been obtained in the cores in red giants, offering for the first time significant insight on the structure and geometry of these fields. Up until now, only 70 out of around 20,000 red giants from the *Kepler* catalogue were found with detectable fields. Each of the different studies involved have worked on specific cases to detect core magnetic fields, thereby introducing significant observational biases. To improve the statistics, we need a systematic and complete process to efficiently analyse the entire *Kepler* catalogue.

To accomplish this goal, we have developed a method to automatically identify mixed mode oscillation frequencies in spectra and adjust them to an asymptotic expression for mixed mode frequencies taking rotation and magnetic field into account. This method involves strict statistical criteria for the detection and identification of modes, and the use of a Bayesian framework to accurately and reliably determine the distributions of seismic parameters for the rotation and magnetic field. In this talk we present the first results of this method. We discuss the relationships between magnetism, stellar mass, rotation and stellar evolution, and the link with angular momentum transport. This method will prove useful in the near future to extend the study to PLATO data.