

Behind substantial barriers: observing stellar interiors with asteroseismology

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'Classical' observations of the light from stars provide information about the overall stellar properties, including surface temperature and composition, but say little about their interiors. As noted by Sir Arthur Eddington early in the previous century stellar interiors are inaccessible to direct observation, owing to the high opacity of stellar matter. Information about internal properties of stars therefore had to be inferred from stellar modelling, a field that Eddington pioneered. However, in the last few decades much more direct information has become available, through the analysis of observations of stellar surface oscillations, caused by waves that penetrate the stellar interior. Such helioseismic investigations of the Sun have provided detailed information about the solar internal structure and rotation, at a level comparable to what can be obtained from geoseismic studies of the Earth. More recently space observations, particularly with the NASA Kepler satellite, have opened a broad range of stars to asteroseismic analysis. I provide an overview of the results that have been obtained, with emphasis on the spectacular investigations of the internal properties of red-giant stars.