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Dynamical Tides and Oscillations in Star and Planetary Systems

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The oscillations of stars and planets are a powerful tool for understanding the structure and evolution of these bodies. In compact white dwarf (WD) binaries, tidally excited waves within the WDs deposit energy and angular momentum within the WDs, producing strong tidal dissipation. The tidal torque spins up the WDs such that they are nearly synchronously rotating by the onset of mass transfer. Tidal heating may make the WDs more luminous by orders of magnitude, and it could even reignite thermonuclear fusion in the WD's hydrogen shell. In various types of star systems observed by *Kepler*, tidally excited oscillations are detectable and provide direct constraints on tidal dissipation rates in these systems. Finally, in the planet Saturn, planetary oscillation modes have been detected via their gravitational influence on the rings. The frequencies of the modes allow for the first seismic constraints on a planet other than the Earth, and they provide evidence for non-conventional structures within Saturn.