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# Asteroseismology of Pre-White Dwarfs with Hydrogen-dominated Atmospheres

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## Abstract

Pre-white dwarfs still have double nuclear burning shells. We investigate the nuclear driven mechanism in pre-DA white dwarfs that have substantial hydrogen shell-burning, by carrying out a fully non-adiabatic analysis for oscillations of those stars evolved from the post-asymptotic giant branch. It is shown that nuclear reactions in the hydrogen burning-shell excite low-degree g modes in the period range of about 50-200 s for the pre-white dwarfs with  $T_{\text{eff}} = 40,000 \text{ K} - 300,000 \text{ K}$ . It is also shown that the amount of hydrogen gives a significant influence on the instability domain of such pre-white dwarfs in the Hertzsprung-Russel diagram. Thus, the thickness of hydrogen-dominated envelopes can be well constrained by observing the presence of the g-mode oscillations. This opens a new window of asteroseismology to unveil the invisible interior of pre-white dwarfs and the relevant unsolved physics.

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