Pulsations of relativistic ultra-massive white dwarfs

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Ultra-massive ($M_\star \geq 1.05 M_\odot$) hydrogen-rich white-dwarf stars of spectral type DA are expected to be partially crystallized by the time they reach the ZZ Ceti (or DAV) instability strip ($10\,500 \leq T_{\rm eff}/{\rm K} \leq 12\,500$ K), stage in which they become pulsating stars. The ultra-massive ZZ Ceti stars known up to date have masses slightly below $\sim 1.3\ M_\odot$, thanks to which it is possible to study their pulsations in the context of Newtonian theory of stellar oscillations. However, it would be possible that more massive pulsating DA white dwarfs could be identified in the coming years with the advent of huge volumes of high-quality photometric data collected by space missions such as the ongoing *TESS* mission and the future *Plato* space telescope. In that case, the importance of General Relativity effects for the structure and pulsations of ultra-massive ZZ Ceti stars cannot be neglected, and it will be necessary to consider pulsational models of relativistic ultra-massive white dwarfs. In this work, we present the first results of the calculation of pulsations in relativistic white dwarfs. As a first step, we consider stellar models of ultra-massive white dwarfs computed within the framework of the general theory of relativity, but compute pulsations in the context of Newtonian theory of stellar oscillations. We describe the differences we find in the typical g-mode periods of ZZ Ceti stars, as compared with the case in which we consider Newtonian models of ultra-massive white dwarfs. In a second step, we will take into account the effects of General Relativity on the non-radial stellar pulsations too.