

Abstract Submitted
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R-mode frequencies of rapidly and differentially rotating relativistic neutron stars CECILIA CHIRENTI, MICHAEL JASIULEK, Center for Mathematics, Computation and Cognition - UFABC — R-modes are a promising source of gravitational waves for ground based detectors. If the precise frequency is known, guided gravitational wave searches with higher detectability are possible. Many authors have calculated the r-mode frequency because of its physical importance. For the dominant mode its value is $4/3$ times the angular velocity of the star, subject to various corrections, of which the most important are relativistic and rotational corrections. Here we extend the results from previous works and investigate the effect of rapid rotation and differential rotation on the r-mode frequency. We evolve the perturbation equations in Cowling approximation in time using finite differencing methods to compute the r-mode frequency for sequences of rotating neutron stars with polytropic equations of state. The results presented here are relevant to the design of gravitational wave and electromagnetic r-mode searches.

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