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## Non-analytic relativistic r-modes of slowly rotating neutron stars

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Since 1997 the attempts to build the relativistic generalization of the Newtonian r-modes - predominantly toroidal oscillations, inherent to rotating neutron stars, - have lead to contradictory results concerning the properties of their frequency spectrum. While numerical calculations predict the discrete oscillation spectrum, theoretical studies in the slow-rotation approximation relying on traditional techniques predict the presence of continuous part in the spectrum. In this talk we present a new original approach to the study of relativistic perturbation equations. Within this approach under a number of assumptions we show, that relativistic r-modes form a class of non-analytic in stellar angular velocity solutions to the oscillation equations, characterized by discrete oscillation spectrum very similar to that of Newtonian r-modes. The elaborate analysis of the obtained equations in the limit of extremely slow stellar rotation allows to obtain the explicit expressions for the r-mode eigenfunctions and oscillation spectrum in this limit. We find no indications of the presence of the continuous part in the spectrum neither in theoretical analysis nor in numerical calculations.

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