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Improved Photometric Identification Formula for Pulsating Stars

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In this talk a detailed review of stellar pulsation and radiative transfer equations are presented. Starting from the radiative transfer equations and by considering appropriate physical conditions and mathematical formulations, we derived a formula that describes the effect of pulsations in the light output of a star. We took into consideration the interaction of light with the different layers of the atmosphere. This is an improvement from previous studies where the atmosphere is treated as a single layer at $\tau = 2/3$. In this talk, we also investigated the depth dependence of eigenfunctions in the atmosphere of pulsating stars.
Our results demonstrate that the displacement eigen function $\delta r/r$, the temperature eigen function $\delta T/T$ and the opacity eigenfunction show great variability in the atmosphere of the equilibrium models studied. Our formalism is based on non-grey approximation where the pulsation equation and opacity depends on depth and frequency of observation. We also showed that the observed luminosity, for high overtone pulsators, comes from all the layers above the photosphere and the upper layer
contributes the most. Moreover, from the equilibrium models considered in this study, the plots of the temperature eigen function as a function of depth demonstrated that, even with small T_eff, the atmosphere of a pulsating star will not be considered as a solitary and distinct layer as depicted
by Watson, (1987) and Watson, (1988). we also show the depth dependence of eigenfunctions in the atmosphere of pulsating stars.

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