National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Asteroseismic study of O and B-type supergiants
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Venue	: MC 126
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Abstract : High precision time series photometry from the space telescopes such as MOST, CORoT, BRITE, Kepler and TESS missions has opened a new window in the study of massive O and B type stars by providing detailed, long-term light curves. Additionally, high resolution ground based spectroscopic surveys like IACOB and OWN complement the photometric data, offering in-depth information on stellar atmospheres and spectral lines. These observations have revealed significant and diverse variabilities in these stars, both in the photometric and the spectroscopic domain.

Among the O and B-type stars, supergiants (luminosity class I) show variations in their visual light curve as well as in their line profiles. In addition, they show significant mass loss. The origin of these variabilities, and their connection with mass loss is not well understood. Stellar pulsation has been suggested as a possible cause of this variability. We intend to comprehensively study the pulsation in supergiants, the mechanisms responsible for their excitation and the possible connection with the mass loss. To that end, we construct models of these stars and perform a linear stability analysis. The eigenfrequencies of stellar models are calculated and compared with observed frequencies.

For a case study, we consider the highly luminous B-supergiant &epsilon Ori which shows significant line profile variability with a range of periods and attempt to characterize its observed variability. Some of the observed frequencies can be explained in terms of radial pulsation. In future, nonlinear simulations will be carried out to study the final fate of unstable models and estimate pulsationally driven mass-loss. The stable pulsation in this class of stars, if established, can be used to probe their interior structure and properties such as rotation, magnetic fields and convective overshoot which strongly affect their evolution.