ON THE STABILITY OF HOMOGENEOUS AND NON-HOMOGENEOUS THERMAL STRUCTURES OF MOLECULAR GAS

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The thermal stability of molecular gas structures is analyzed. A heating rate by cosmic rays and photo-electrons from grains, a cooling rate \( \sim \exp(-\alpha/T) \) and a thermal diffusion by neutral particles are assumed. The linear stability of the thermal equilibrium steady state solutions: (heating = cooling) is analytically carried out. In particular, instability criteria and explicit coupling relations between the resulting modes are obtained. The non-equilibrium thermal steady state solutions: (heating \( \neq \) cooling) and the corresponding eigenvalue problem are numerically solved. Several implications for molecular regions of the interstellar medium are also discussed.

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THE CLUSTERING PROPERTIES OF THE YOUNG STARS IN ORION A AND \( \lambda \) ORIONIS

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Using synthetic models we investigate the possibilities of the two-point angular correlation function as a clustering searching/analyzing tool. We are particularly interested in the physical interpretation of features in the correlation function such as: power-law indexes, breaking points, and scale at which the correlation function goes to zero. In general, breaks are related with the clusters' radii and the correlation function goes to zero at the length of the clusters' configuration. The influences in the correlation function features of a background population in which the clusters may be embedded are also tested. The main effect depends critically on the density contrast between the clusters and the background population and is to dilute features in the correlation function.

This technique is applied to the study of the clustering properties of the Hα emission and OB stars in Orion A and to the \( \lambda \) Orionis association. The correlation functions for the Hα emission and the OB stars in Orion A are fitted by power-laws

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