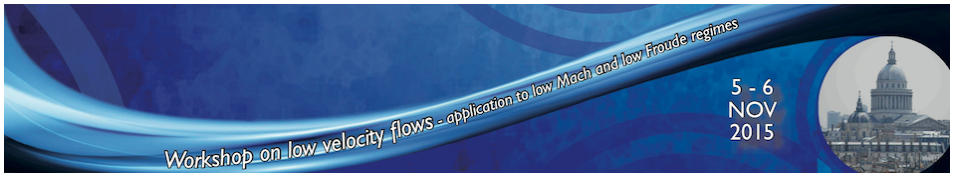

ID de Contribution: **5** Type: **Non spécifié**

Turbulent kinetic energy transfers in low-Mach wall-bounded flows

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The context of the study is high temperature solar receivers (SR). The main characteristics of flow inside a SR are turbulence (because flow rates are important) and temperature gradient (because only one face of the SR receives concentrated sunlight). A specific algorithm for the resolution of low-Mach equations is proposed in order to improve mass and energy conservations. Direct numerical simulations (DNS) of a simplified solar receiver in a bi-periodic plane channel are carried out in order to analyze the coupling between turbulence and temperature gradients.

The results show that the temperature gradient creates asymmetric profiles of mean and fluctuating velocities. This asymmetry cannot only be explained by the fluid property variations as a function of temperature. It is truly related to the coupling of velocity / temperature, which mainly leads to an increase of the turbulent intensity at the cold side and to its decrease at the hot side. The analysis of the turbulent kinetic energy in the physical and in the spectral domains shows that temperature gradient changes the mechanisms of production, transfer and dissipation.

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