Poster 1 Llor, Bailly & Poujade

1D numerical simulations of various self similar accelerated turbulent mixing layers using the 2SFK model.

Antoine Llor[1], Pascal Bailly[2] & Olivier Poujade[2]

1. CEA/Siège,
31-33, rue de la Fédération, 75752 Paris cedex 15, France
antoine.llor@cea.fr

2. CEA/DAM,
BP12, 91680 Bruyères le Châtel, France
pascal.bailly@cea.fr, olivier.poujade@cea.fr

The turbulent mixing zone (TMZ), arising from gravitationally induced instabilities at the interface of two stratified fluids, is modelled and evolved using the 2 Structures, 2 Fluids and 2 turbulent fields (2SFK) concept (Llor & Bailly 2003; Llor, Bailly & Poujade 2004) summarized in an oral presentation at this conference. The full model is here given explicitly without extensive justifications.

This model has been implemented in a 1D simulation code (fully explicit, bi-Lagrange and remap, second order in space and time) and we present, on this poster, the numerically simulated self similar evolution of the TMZ under the influence of various kinds of acceleration fields (SSVARTs; Llor 2003). After a transient period, the profile of any physical quantity reaches a self similar regime.

Two types of quantities are presented for different Atwood numbers: global, which are time dependant and space averaged over the whole TMZ; and local, which depend on time and position and are often plotted as a function of position in the TMZ at a given time during the self similar evolution. The global quantities are the four basic mean self-similar parameters: the bubble and spike growth coefficients, and for vanishing Atwood numbers, the mean effective Knudsen number of turbulent transport, the mean molecular mixing fraction and the mean Reynolds tensor anisotropy. They are found to be in good agreement with experimental and numerical (DNS, LES) results. The local quantities are the volume fraction profiles of fluids and structures, and for each structure, the velocity, the integral length scale, the different energy reservoirs and production terms. These profiles reproduce qualitative behaviours as given by accepted buoyancy-drag models, and they are consistent with numerical (DNS, LES) results.

References

LLor, A. & Bailly, P. 2003 A new turbulent 2-field concept for modelling RT, RM and KH mixing layers; *Laser Part. Beams* (in press).

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LLor, A. 2003 Bulk turbulent transport and structures in RT, RM and variable acceleration instabilities; *Laser Part. Beams* (in press).