Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Three-dimensional convective and absolute instabilities in pressure-driven two-layer channel flow KIRTI SAHU, Department of Chemical Engineering, Indian Institute of Technology Hyderabad, Yeddumailaram 502 205, Andhra Pradesh, India, OMAR MATAR, Department of Chemical Engineering, Imperial College London, South Kensington Campus, London, SW7 2AZ, UK — A generalized linear stability analysis of three-dimensional disturbance in a pressure-driven two-layer channel flow, focusing on the range of parameters for which Squire's theorem does not exist is considered. Three-dimensional linear stability equations, in which both the spatial wavenumber and temporal frequency are complex, are derived and solved using an efficient spectral collocation method. A Briggs-type analysis is then carried out to delineate the boundaries between convective and absolute instabilities in m-Re space. We find that although three-dimensional disturbances are temporally more unstable than the two-dimensional disturbances, absolute modes of instability are most unstable for two-dimensional disturbances. An energy "budget" analysis also shows that the most dangerous modes are "interfacial" ones.

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Date submitted: 26 Jul 2011 Electronic form version 1.4