Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

On the effect of large amplitude excitations on the boundary layer separation ROUSLAN KRECHETNIKOV, Carleton University, Ottawa, Canada — It is known that periodic excitations of a boundary layer may lead to the delay of separation or to the reattachment of initially separated flow. The "transition" from separated states to reattached ones is described by a curve in the perturbation frequency-amplitude space. This phenomenon of reattachment takes place for periodic excitations of small amplitudes. However, the flow, which is reattached due to periodic excitations, becomes separated again if the amplitude of the perturbation increases up to a considerable level. This, in turn, defines a new curve for the transition from reattached to separated flow in the same frequency-amplitude space. This talk is devoted to a minimal model, which explains the existence of this latter transition curve. The model is based on the unsteady Prandtl boundary layer equations, which are analyzed as a problem of receptivity to high amplitude periodic perturbations. The flow separation is identified using Wang's separation criteria (Wang, 1982), i.e. formation of limiting streamlines in Lagrangian space.

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Date submitted: 01 Aug 2006 Electronic form version 1.4