1032-76-97 **Natalia Vladimirova*** (nata@flash.uchicago.edu) and **Michael Chertkov**. *Numerical study of reactive Rayleigh-Taylor instability.*

We consider the Rayleigh-Taylor (RT) instability between two miscible fluids in the presence of reaction; the reaction transforms heavier fluid into lighter fluid. The physical model is highly simplified - we use the Boussinesq buoyancy approximation and a one-step reaction mechanism, which allows us to fully resolve all viscous and diffusive effects in three dimensions. The novelty of this work is that the nonreacting RT problem is used as the base case, and the effects of weak/moderate/strong reaction are quantified using traditional turbulence diagnostics. As in the classical RT problem, we follow the evolution of the instability in an "infinite" domain, ensuring that the results are minimally affected by the finite size of the simulation. A number of earlier studies have shown that finite size effect stabilizes the reaction; here we are trying to eliminate the stabilizing effect of the walls. We focus on resolving both the large scale dynamics and the internal structure of the mixing zone/chemical front conglomerate. (Received August 15, 2007)