

**Meeting:** 1001, Evanston, Illinois, SS 4A, Special Session on Fluid Dynamics, Diffusion and Reaction

1001-35-378      **Jean-Michel Roquejoffre\*** ([roque@mip.ups-tlse.fr](mailto:roque@mip.ups-tlse.fr)), Laboratoire MIP, Universit Paul Sabatier, 118 route de Narbonne, 31 062 Toulouse, France. *Estimates in singularly perturbed models for diffusion flames.*

As opposed to premixed flames, where the fuel and the oxidant are already mixed and ready to react, a diffusion flame can be described, in the simplest cases, by a chemical reaction  $\text{Oxidant} + \text{fuel} \rightarrow \text{products}$ . The fuel and oxidant are initially separated, and mix on a thin sheet, where the flame occurs. The standard way to model this is to use a singularly perturbed (elliptic or parabolic) system which, in the limit, gives an interface problem. This, as a matter of fact, is the basis of the celebrated Burke-Schuman approximation for diffusion flames. The goal of the talk is to derive uniform estimates - with respect to the small parameter - for the solutions of the model. The optimal regularity is, in general, Hölder. In some cases, linear combinations between the equations allow to reach Lipschitz regularity, as well as error estimates.

Joint work with L. Caffarelli. (Received August 31, 2004)