1021-35-114　　　　　**Eduardo V. Teixeira*** (`teixeira@math.rutgers.edu`), Department of Mathematics, Rutgers University, Hill Center, Busch Campus, 110 Frelinghuysen Road, Piscataway, NJ 08854. *Free Boundary Problems arising from singular perturbations.*

We shall present recent advances on of free boundary limiting problems that appear in the flame propagation theory. Mathematically, let L be a 2nd order elliptic operator, and b_ε an approximation to the Dirac delta function. We study uniform-in-ε estimates of solutions to

$$Lu_\varepsilon = b_\varepsilon(u_\varepsilon).$$

Our ultimate goal is to study regularity and geometric measure properties of the limiting free boundary problem, $Lu_\infty = 0$ in $\{u_\infty > 0\}$ obtained as $\varepsilon \to 0$. (Received August 31, 2006)