

Meeting: 1003, Atlanta, Georgia, SS 28A, AMS-SIAM Special Session on Reaction Diffusion Equations and Applications, I

1003-35-1424 **Junping Shi*** (shij@math.wm.edu), Department of Mathematics, College of William and Mary, Williamsburg, VA 23187-8795, and **Xuefeng Wang** (xdw@math.tulane.edu), Department of Mathematics, Tulane University, 6823 St. Charles Ave, New Orleans, LA 70118. *Isothermal Balls in an autocatalytic chemical reaction*. Preliminary report.

The reaction and diffusion of the two reactant A and B in an isothermal autocatalytic chemical reaction can be described as

$$a_t = D_A \Delta a - ab^p, \quad b_t = D_B \Delta a + ab^p, \quad x \in \mathbf{R}^n,$$

where D_A and D_B are diffusion constants, and $p > 1$. When p is large, there exists a family of radially symmetric equilibrium solutions known as flame balls in the combustion context, and it is suggested that they are unstable but may indicate the minimal size for a perturbation to initiate a traveling wave solution. We will rigorously establish the instability of these flame balls. If time allows, we will also describe the bifurcation of steady state solutions on a finite reactor. (Received October 05, 2004)