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Junping Shi* (shij@math.wm.edu), Jones Hall 114, Department of Mathematics, College of William and Mary, Williamsburg, VA 23187. *Bistable dynamics in autocatalytic chemical reactions.*

We consider a parabolic system that models an isothermal autocatalytic chemical reaction. If the spatial domain has dimension higher than 2 and the “order” of the reaction is high enough, then it is known that the system has a family of non-trivial steady states. We prove that each of these steady states is a “hair-trigger” for two types of long time behavior: if the initial value is below the steady state, then the solution of the system converges to a rest state of the system as time goes to infinity and so extinction occurs; if the initial value is above the steady state, then a wave front is developed and so we have the spread of “flame”. We also supply some criteria on the initial value for spread/extinction of the reaction. We also consider the case of bounded reactor, and a S -shaped bifurcation diagram and bistable dynamical behavior are proved. The talk reports recent joint work with Xuefeng Wang of Tulane University, Yuwen Wang and Yuhua Zhao of Harbin Normal University, and Jifa Jiang of Tongji University. (Received August 29, 2006)