1003-35-883   **Yuanwei Qi*** (`yqi@pegasus.cc.ucf.edu`), Department of Mathematics, UCF, Orlando, FL 32816. *The Universality of Chemical Reaction Systems with Critical Nonlinearity.*

In this talk, we discuss some recent results on the Cauchy problem of a cubic autocatalytic chemical reaction system

$$u_{1,t} = u_{1,xx} - u_1 u_2^2, \quad u_{2,t} = d u_{2,xx} + u_1 u_2^2$$

with non-negative initial data, where the constant $d > 0$ is the Lewis number and related systems. Our purpose is to study the global dynamics of solutions under mild decay of initial data as $|x| \to \infty$. In particular, we show that for a large class of L^1 initial data, the exact large time behaviour of solutions is characterized by a universal, non-Gaussian spatio-temporal profile, subject to the apparent conservation of total mass. (Received September 30, 2004)