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

1003-34-1053 **Fu Zhang*** (fzhang@tntech.edu), Dept of Math, Box 5054, Tennessee Tech University, Cookeville, TN 38505. *Existence of Pulse and Spikes in Standing Waves of a Reaction-Diffussion System.*

In this talk, I will present our most recent results on the existence of standing waves of a system of reaction-diffusion equations:

$$\{\, u_t = f(u, w, x) + u_{xx} \qquad x \in R w_t = \delta(\varepsilon^2 g(u, w) + w_{xx})$$

For the homogeneous system, namely f doesn't depend on x, we established the existence of pulse and multiple spikes in the standing waves. When f depends on x, we prove similar but new results. A topological shooting method, which is based on a two dimensional shooting principle, is developed to prove both results. The reaction functions f and g satisfy a set of general hypotheses which make our model include biological and physical systems like excitatory and inhibitory interactions in localized populations of neurons, interaction of photon and photo excited carriers in semiconductor materials. (Received October 04, 2004)