Meeting: 998, Houston, Texas, SS 4A, Special Session on Nonlinear Analysis

998-35-210 **C. Y. Chan*** (chan@louisiana.edu), Department of Mathematics, University of Louisiana at Lafayette, Lafayette, LA 70504-1010. *Degenerate Parabolic Equations With Localized Nonlinear Reactions.* Preliminary report.

Let q, b and a be any real numbers with $q \geq 0$, and $0 < b < a$. Let us consider the following degenerate semilinear parabolic problem with a localized nonlinear reaction situated at b:

$$\begin{aligned} x^q u_t - u_{xx} &= f(u(b,t)) \text{ in } (0,a) \times (0,\infty), \\ u(x,0) &= u_0(x) \text{ on } [0,a], u(0,t) = u(a,t) = 0 \text{ for } 0 < t < \infty, \end{aligned}$$

where f and u_0 are given functions. This describes a physical phenomenon in which the nonlinear reaction takes place only at the single site b. Existence of a unique solution, and both blow-up and quenching phenomena are discussed. (Received Febuary 27, 2004)