1015-35-119 **Marianne Korten*** (marianne@math.ksu.edu), Department of Mathematics, 138 Cardwell Hall, Manhattan, KS 66506. *Free boundary measures and partial regularity of solutions in a mixed-type evolution equation.* Preliminary report.

Solutions of the mixed type equation

$$u_t = \Delta_x \alpha(u) + \mathrm{div}_x F(u),$$

where $x \in I\!R^n$, $\alpha(u)$ is a continuous piecewise linear function such that $\alpha(u) = 0$ for $|u| \leq 1$ and having slope 1 otherwise, and $F(u)$ is a Lipschitz from $I\!R$ to $I\!R^n$, combine the features of solutions of conservation laws, and of free boundary problems.

We will discuss the regularity of weak solutions to this equation, in particular, we will show that for solutions locally in L^2, $\alpha(u)$ satisfies local energy estimates, and that u is continuous in the set $\{|u| > 1\}$. With this in hand we will identify the free boundary measures supported on the boundary of $\{|u| > 1\}$. This allows us to study separately the jumps in u at the free boundary and the discontinuities occuring within the region $\{|u| < 1\}$ governed by the consevation law.

This is part of ongoing work with G-Q. Chen, C. N. Moore, and M. Torres. (Received February 01, 2006)