1019-60-110 **Eulalia Nualart*** (nualart@math.utah.edu), University of Utah, Department of Mathematics, 155 S 1400 E, JWB 118, Salt Lake city, UT 84112. *Hitting probabilities for systems of non-linear stochastic heat equations.*

In this talk we develop potential theory for a system of d non-linear stochastic heat equations in spatial dimension 1 driven by d-dimensional space-time white noise. Using techniques of Malliavin calculus, we establish upper and lower bounds on the one-point density of the solution $u(t,x)$, and upper bounds of Gaussian-type on the two-point density of $(u(s,y),u(t,x))$. In particular, this estimate quantifies how this density degenerates as $(s,y) \to (t,x)$. From these results, we deduce upper and lower bounds on hitting probabilities of the process $(u(t,x), t \in \mathbb{R}_+, x \in [0,1])$, in terms of respectively Hausdorff measure and Newtonian capacity. These estimates make it possible to show that points are polar when $d \geq 7$ and are not polar when $d \leq 5$. We also show that the Hausdorff dimension of the range of the process is 6 when $d > 6$. Finally, we obtain the values of the Hausdorff dimensions of the level sets of these processes. (Received August 09, 2006)