

# A Phase Transition in Spatial Epidemics

by

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## Abstract

We consider a SPDE which arises as the limit of spatial *SIR* (susceptible/infected/recovered) epidemics (see Lalley (2007)) for the one dimensional case, and Lalley and Zheng (2008) for the two and three dimensional case). We show that there exist critical values  $\theta_c(d)$  such that in dimensions  $d = 2$  and  $3$ , if a certain parameter in the SPDE is bigger than  $\theta_c(d)$ , then the solution survives forever with positive probability; furthermore, in all dimensions  $d = 1, 2$  and  $3$ , if the parameter is smaller than  $\theta_c(d)$ , then the solution dies out with probability 1.

This is joint work with Steven P. Lalley (University of Chicago) and Edwin A. Perkins (University of British Columbia).

## References:

Lalley, S. (2007), *Spatial Epidemics: Critical Behavior in One Dimension*, to appear in *Probab. Theory Related Fields*, *arXiv:math/0701698v2*.

Lalley, S. P. and Zheng, X. (2008) *Spatial epidemics and local times for critical branching random walks in dimensions 2 and 3*, submitted, current version available at <http://www.math.ubc.ca/~xhzheng/SIR.pdf>.