1085-60-155 **Partha Sarathi Dey*** (partha@cims.nyu.edu) and **Shirshendu Chatterjee**. *Multiple phase transitions for long-range first-passage percolation on square lattice.*

Given a graph G with non-negative edge weights, the passage time of a path is the sum of weights of the edges in the path, and the first-passage time to reach u from v is the minimum passage time over all paths joining them. We consider a long range first-passage model on Z^d in which, the weight w of the edge joining x and y has an exponential distribution with mean $|x-y|^\alpha$, and the edge weights are independent. We analyze the growth of the set of vertices reachable from the origin within time t, and show that there are four different growth regimes depending on the value of α. For $\alpha < d$, the growth is instanteneous; for $\alpha \in (d, 2d)$ the growth rate is stretched exponential; for $\alpha \in (2d, 2d+1)$ the growth rate is superlinear and finally for $\alpha > 2d+1$ the growth rate is linear like the standard first-passage percolation model. (Received September 07, 2012)