More results on Hamilton cycles in random geometric graphs

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We pick n points uniformly at random from the unit square and add edges one by one by order of increasing edge length. Recently we showed that, with probability tending to 1 as the number of points n tends to infinity, the resulting graph obtains is first Hamilton cycle at precisely the same moment it loses its last vertex of degree two. This solved a question of Penrose.

In this talk I will show that, with probability tending to 1 as the number of points n tends to infinity, the following are also true:

- the graph becomes pancyclic (i.e. it has vertices of all lengths between 3 and k) at the same moment it loses its last vertex of degree two;

- the graph becomes Hamilton-connected (i.e. for any two vertices there is a Hamilton path between them) at the same moment it loses its last vertex of degree three;

- the graph first obtains k edge disjoint Hamilton cycles at precisely the same time it loses its last vertex of degree 2k-1.

This last result (as well as the solution of Penrose's question) were obtained independently by Perez and Wormald.