



Poisson Hail on a Hot Ground

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We consider a queue where the server is the Euclidean space, and the customers are random closed sets (RACS) of the Euclidean space.

These RACS arrive according to a Poisson rain and each of them has a random service time (in the case of hail falling on the Euclidean plane, this is the height of the hailstone, whereas the RACS is its footprint).

The Euclidean space serves customers at speed 1. The service discipline is a hard exclusion rule: no two intersecting RACS can be served simultaneously and service is in the First In First Out order: only the hailstones in contact with the ground melt at speed 1, whereas the other ones are queued; a tagged RACS waits until all RACS arrived before it and intersecting it have fully melted before starting its own melting.

We prove that it is stable for a sufficiently small arrival intensity, provided the typical diameter of the RACS and the typical service time have finite exponential moments. We also discuss the percolation properties of the stationary regime of the RACS in the queue.