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Covering the plane by rotations of a lattice arrangement of disks.

Suppose we put an ϵ -disk around each lattice point in the plane, and then we rotate this object around the origin for a set Θ of angles. When do we cover the whole plane, except for a neighborhood of the origin? It is very easy to see that if $\Theta = [0, 2\pi]$ then we do indeed cover. The problem becomes more interesting if we try to achieve covering with a “small” closed set Θ . For instance, we prove that any arc Θ suffices for covering. (Received December 28, 2006)