

1067-AB-2198 **Matthew Cook***, Institute of Neuroinformatics, 190 Winterthurerstrasse, CH-8057 Zurich, Switzerland. *On the Roundness of Rotor Router Blobs.*

The “Rotor Router” model is an extremely simple rule found by Jim Propp, in which each grid location absorbs the first particle to arrive and thereafter routes arriving particles to one of its four neighbors in a clockwise repetitive sequence. If we inject many particles at the origin, each particle (after the first) gets routed around until it arrives at an unvisited site where it gets absorbed. Surprisingly, the resulting area of absorbed particles is nearly a perfect circle, a phenomenon for which we have neither a proof nor even any clear heuristic reasoning, despite the simplicity of the process that creates the shape. We will present some experimental results showing that this shape is within a third of a pixel of being a perfect circle, and that even the slight remaining irregularities follow a clear pattern. We will also present some conjectures regarding the shapes and rotor patterns produced by this process, including one regarding the convexity of the shape, which leads to a surprising application of Pick’s theorem. (Received September 22, 2010)