

Abstract Submitted
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Statistics and dynamics in an optical vortex¹ YAEL ROICHMAN, YULIA SOKOLOV, DEREK FRYDEL, Tel Aviv University, DAVID GRIER, New York University, HAIM DIAMANT, Tel Aviv University — When two identical particles are driven along a straight line by an identical force there are no attractions forces between them. Surprisingly, when the same two particles are driven along a ring of light, with identical force, they attract and form a pair. The pairing mechanism is a pure non-equilibrium phenomena and is a result of symmetry breaking due to the path's curvature. We use experiment, simulation and theory to demonstrate and explain this effect. We show that dynamic limit-cycles and structure emerge due to this pseudo-potential in many particle systems, and demonstrate how they depend on temperature and trapping stiffness.

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