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Swarming in disordered environments AJAY GOPINATHAN, DAVID A. QUINT, University of California Merced — The emergence of collective motion over a wide range of length scales in biology has inspired research in a multitude of disciplines. Possessing only local information, a group of moving individuals can form crowds, swarms or flocks which can traverse the entire system forming a self organized co-moving collective. An important question that arises is: how do these groups deal with environmental disorder? It is rare that perfectly connected homogeneous environments exist in nature and more often biological environments are intrinsically spatially disordered. We investigate the effects of intrinsic disorder or *topological noise* on the formation of collective motion by studying interacting agents on a $2d$ percolated lattice with bond occupation probability p. We find that the existence of collective motion depends critically on p and disappears completely for rather small amounts of disorder. Furthermore, we show that repulsive forces between agents within the swarm can rescue collective motion even for large amounts of topological disorder, suggesting that nearest neighbor alignment alone is not enough for swarms to navigate a disordered environment.

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