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Spin lattices of walking droplets[1] PEDRO SAENZ, GIUSEPPE PUCCI, ALEXIS GOUJON, JORN DUNKEL, JOHN BUSH, MIT — We present the results of an experimental investigation of the spontaneous emergence of collective behavior in spin lattice of droplets walking on a vibrating fluid bath. The bottom topography consists of relatively deep circular wells that encourage the walking droplets to follow circular trajectories centered at the lattice sites, in one direction or the other. Wave-mediated interactions between neighboring drops are enabled through a thin fluid layer between the wells. The sense of rotation of the walking droplets may thus become globally coupled. When the coupling is sufficiently strong, interactions with neighboring droplets may result in switches in spin that lead to preferred global arrangements, including correlated (all drops rotating in the same direction) or anti-correlated (neighboring drops rotating in opposite directions) states. Analogies with ferromagnetism and anti-ferromagnetism are drawn. Different spatial arrangements are presented in 1D and 2D lattices to illustrate the effects of topological frustration.

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