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Minimal Model for Noise-Driven Locomotion MADAN RAO, Raman Research Institute and National Centre for Biological Sciences, Bangalore, SRIRAM RAMASWAMY, Indian Institute of Science — We consider a pair of dissimilar particles, bound to each other by a non-centrosymmetric pair potential and restricted to move on a line, in the presence of white noise and nonlinear damping. We show analytically and numerically that the absence of an equilibrium fluctuation-dissipation relation, together with the asymmetry of the pair potential, causes the relative coordinate of the pair to drive a systematic mean motion of the centre of mass, without the aid of an external ratchet potential. This remarkably simple model of noise-driven self-propulsion illustrates a principle that should apply to a variety of driven systems, from biology to granular matter.

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