Soliton creation, propagation, and annihilation in aeromechanical arrays of one-way coupled bistable elements TESSA ROSENBERGER, JOHN F. LINDNER, The College of Wooster — We study the dynamics of mechanical arrays of bistable elements coupled one-way by wind. Unlike earlier hydromechanical unidirectional arrays, our aeromechanical one-way arrays are simpler, easier to study, and exhibit a broader range of phenomena. Soliton-like waves propagate in one direction at speeds proportional to wind speeds. Periodic boundaries enable solitons to annihilate in pairs in even arrays where adjacent elements are attracted to opposite stable states. Solitons propagate indefinitely in odd arrays where pairing is frustrated. Large noise spontaneously creates soliton- antisoliton pairs, as predicted by prior computer simulations. Soliton annihilation times increase quadratically with initial separations, as expected for random walk models of soliton collisions.

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