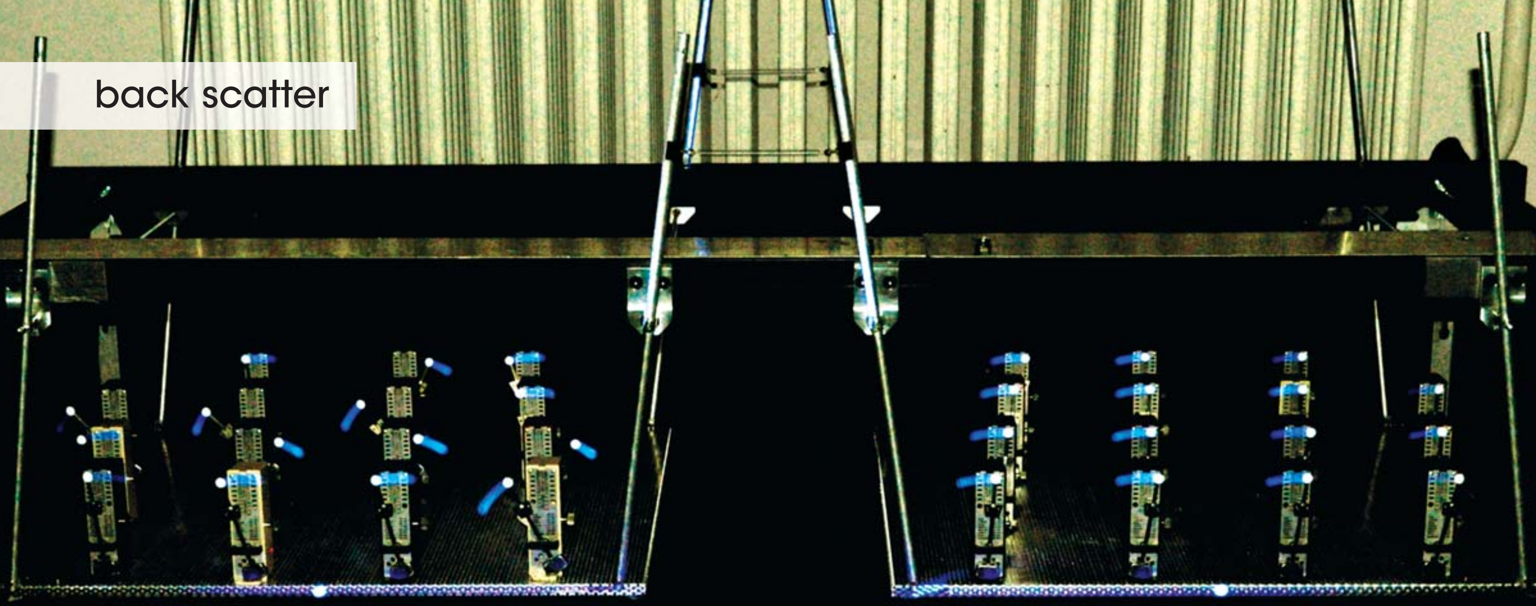

A mechanical chimera

The counterintuitive, complex synchronization state known as a chimera was discovered theoretically a decade ago: In an ensemble of coupled oscillators, two incongruous domains, one synchronized and one desynchronized, can coexist even when the oscillators are identical and the system is symmetric. Chimera states made their laboratory debut last year in a pair of experiments—one with optical oscillators, another with chemical oscillators, both exploiting computer-mediated feedback (see PHYSICS TODAY, October 2012, page 17). Now, with just springs, swings, and metronomes, a quartet of researchers rooted in the Max Planck Institute for Dynamics and Self-Organization in Göttingen, Germany, has achieved the first purely mechanical implementation of chimera states.

On the left, 15 metronomes sit on a swing that, through its left–right motion, couples the metronomes to each other. (It was with a similar setup that Christiaan Huygens discovered spontaneous synchronization 300 years ago.) A pair of springs connects the left swing to an identically loaded swing on the right and provides weak coupling between the two metronome sets. Such nonlocal, nonuniform coupling is key for chimeric behavior. When illuminated with UV light, fluorescent spots on the metronome pendulums leave bright blue trails that, for certain spring constants and metronome frequencies, manifest a chimera state: While the metronomes on one swing tick in unison, the other metronomes oscillate incoherently. Since the mechanical elements have ready analogues in numerous physical, biological, and chemical systems, the emergence of complex collective behavior may be relevant in diverse settings, from neural dynamics to power grids. (E. A. Martens et al., *Proc. Natl. Acad. Sci. USA* **110**, 10563, 2013. Image submitted by Shashi Thutupalli and Erik Martens.)

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