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Synchronization: From Metronomes to Fiber Lasers

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Some 344 years ago (give or take) Chritiaan Huygens observed two pendulum clocks spontaneously synchronize; the pendulums always locked in anti-phase. He traced the interaction to the minute motion of the wooden beam which supported the two clocks. In contrast, a simple classroom demonstration using metronomes in place of pendulum clocks – with the same support-coupling mechanism – yields stable in-phase synchronization. I'll explore (and explain) the reasons behind this difference. I'll also describe a surprising connection with synchronized fiber lasers, a longstanding but recently achieved goal in laser physics.