

Pendulum Finds Virtual Soulmate

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What's nerdier than creating an online avatar that fights dragons and raids strongholds? Creating a virtual pendulum that you can sync up to your real-life pendulum. Leave it to physicists to do just that, resulting in a mixed reality state in which the two pendulums swing as one.

Vadas Gintautas and Alfred Hübler of the Center for Complex Systems Research at the University of Illinois are the first to create a linked virtual/real system. They achieved the feat by connecting a real world pendulum with a virtual version that moved under time-tested equations of motion. To get the two pendulums to communicate, the physicists fed data about the real pendulum to the virtual one, and transferred information from the virtual pendulum to a motor that influenced the motion of the real pendulum.

The real and virtual pendulums swung at different rates when they were first introduced. After a brief encounter in a dual reality state, they simply couldn't connect. Friction quickly brought them to a halt. Recognizing that these two pendulums needed to have more in common, the physicists adjusted their swing frequencies until they were more or less on the same wavelength. Upon the next meeting, two pendulums could not help but move in mixed reality unison indefinitely, defying the friction forces that had ended their previous interreality relationship.

Believe it or not, their findings may prove useful. Mixed reality can occur only when the two systems are sufficiently similar. A system with unknown parameters may be synced up to a virtual system whose parameters are set by the physicists. The unknown factors in the real

system can be determined by changing the virtual system until they shift from dual reality to mixed reality. Then, the physicists will have good estimates for the values of the unknown parameters.

What's more, it may help explore existing intersections between virtual realities and the material world. Popular online games such as World of Warcraft incorporate virtual economies in which players can buy, sell, and own property within the game. In the Warcraft economy, avatars deal in virtual gold, but the real players can buy it with real US dollars. Gintautas and Hübler are curious about the possibility of mixed realities emerging from these coupled economies.

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