Title:	Quenching of oscillations in a liquid metal via attenuated coupling
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Abstract:	In this work, we report a quenching of oscillations observed upon coupling two chemomechanical oscillators. Each one of these oscillators consists of a drop of liquid metal submerged in an oxidizing solution. These pseudoidentical oscillators have been shown to exhibit both periodic and aperiodic oscillatory behavior. In the experiments performed on these oscillators, we find that coupling two such oscillators via an attenuated resistive coupling leads the coupled system towards an oscillation quenched state. To further comprehend these experimental observations, we numerically explore and verify the presence of similar oscillation quenching in a model of coupled Hindmarsh-Rose (HR) systems. A linear stability analysis of this HR system reveals that attenuated coupling induces a change in eigenvalues of the relevant Jacobian, leading to stable quenched oscillation states. Additionally, the analysis yields a threshold of attenuation for oscillation quenching that is consistent with the value observed in numerics. So this phenomenon, demonstrated through experiments, as well as simulations and analysis of a model system, suggests a powerful natural mechanism that can potentially suppress periodic and aperiodic oscillations in coupled nonlinear systems.
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