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Synchronization of Spatiotemporal Chaos in Rayleigh-Benard Convection[1] ALIREZA KARIMI, MARK PAUL, Virginia Tech — We study the synchronization of spatiotemporal chaos in Rayleigh-Benard convection using numerical simulations of the Boussinesq equations. We consider one-way coupling between a principal and target convection domain. The principal domain is a large convection layer with no-slip boundaries on all material walls that is exhibiting spatiotemporal chaos. The target domain contains a convection layer that is smaller than the principal domain and is begun from random initial conditions in the temperature field. However, the sidewall boundary conditions of the target domain are given by the time dependent values of the principal domain at the equivalent location. The two domains are considered synchronized when the convection layers exhibit the same dynamics as measured by local and global diagnostics. Using this approach we quantify the length and time scales that describe the synchronization of the two domains over a variety of system parameters.

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