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Making Distinct Dynamical Systems Look Identical Spectrally ANDRE GONTIJO CAMPOS, DENYS BONDAR, RENAN CABRERA, HERSCHEL RABITZ, Princeton University — We use tracking control techniques to match the optical responses of distinct dynamical systems interacting with laser pulses in both quantum and classical regimes. As a result we provide illustrations where a variety of open and closed systems display the same optical response, demonstrating that the optical spectrum alone is not enough to uniquely characterize general dynamical systems. These findings have important implications in quantum inversion techniques encompassing both linear and nonlinear optics. Moreover, the presented results can be applied to designing materials with desired optical responses.

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