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The Turbulent Diffusivity of Convective Overshoot DANIEL LECOANET, Princeton, JOSIAH SCHWAB, UC-Santa Cruz, ELIOT QUATAERT, UC-Berkeley, LARS BILDSTEN, UC-Santa Barbara, FRANK TIMMES, Arizona State University, KEATON BURNS, MIT, GEOFFREY VASIL, University of Sydney, JEFFREY OISHI, Bates College, BENJAMIN BROWN, Unversity of Colorado - Boulder — There are many natural systems with convectively unstable fluid adjacent to stably stratified fluid; including the Earth's atmosphere, most stars, and perhaps even the Earth's liquid core. The convective motions penetrating into the stable region can enhance mixing, leading to changes in transport within the stable region. This work describes convective overshoot simulations. To study the extra mixing due to overshoot, we evolve a passive tracer field. The horizontal average of the passive tracer quickly approaches a self-similar state. The self-similar state is the solution to a diffusion equation with a spatially dependent turbulent diffusivity. We find the extra mixing due to convection can be accurately modeled as a turbulent diffusivity, and discuss implications of this turbulent diffusivity for the astrophysical problem of mixing in convectively bounded carbon flames.

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