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Role of bubble velocity fluctuations on the energy dissipation rates in bubbly Rayleigh-Bénard convection R. LAKKARAJU, L. SCHMIDT, D. LOHSE, University of Twente, The Netherlands, F. TOSCHI, Technical University of Eindhoven, The Netherlands, P. ORESTA, Università del Salento, Italy, R. VERZICCO, Università di Roma Tor Vergata, Italy, A. PROSPERETTI, Johns Hopkins University, USA — We report numerical results for thermal and kinetic energy dissipation rates in bubbly Rayleigh-Bénard convection. The bubbles always homogenize the temperature field by absorbing heat from surrounding fluid and attenuate the thermal energy dissipation. A small number of non-growing bubbles can even halt convection by smoothing the temperature fluctuations which drive the convection. Growing bubbles imply additional forcing on the fluid and thus increase the fluctuations and hence the kinetic energy dissipation. This enhancement depends on the ratio of the sensible heat to the latent heat of the phase change, given by the Jakob number, which determines the dynamics of the bubble growth.

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