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Energy Dissipation in Small Scale Breaking Waves KELLI HENDRICKSON, DICK K.P. YUE, M.I.T. — Direct numerical simulations of small scale breaking waves under a fully couple air-water interface is obtained from the Navier-Stokes equation using a level-set method. An ensemble of non-breaking, and spilling and plunging breaking deep-water waves is generated through different breaking mechanisms, including the effect of wind. The dissipation rate of the breaking event, an unsteady and localized phenomenon, is characterized for both spilling and plunging breaking waves. Total energy lost due to the breaking event is found to be strongly correlated with the amount of energy in the wave prior to breaking. Qualitative comparison to large-scale breaking waves experiment is also found. The results of this work provide a foundation for the development of wave breaking dissipation models for use in computational ship hydrodynamics and ocean wave modeling.

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