1172-37-211 **Benno Rumpf*** (brumpf@smu.edu), Mathematics Department, Southern Methodist University, 3200 Dyer Street, Dallas, TX 75275-0156, and **Yuanting Chen**. *Growth or decay of a coherent structure interacting with random waves.*

Solitary waves interacting with random Rayleigh-Jeans distributed waves of a nonintegrable and non-collapsing nonlinear Schrödinger equation are studied. Two opposing types of dynamics are identified: firstly, the random thermal waves can erode the solitary wave, secondly, this structure can grow as a result of this interaction. These two types of behavior depend on a dynamical property of the solitary wave, namely its angular frequency, and on a statistical property of the thermal waves, the chemical potential. These two quantities are equal at a saddle point of the entropy that marks a transition between the two types of dynamics: high-amplitude coherent structures whose frequency exceeds the chemical potential grow, smaller structures with a lower frequency decay. Either process leads to an increase of the wave entropy. We show this using a thermodynamic model of two coupled subsystems, one representing the solitary wave and one for the thermal waves. Numerical simulations verify our results. (Received August 29, 2021)