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Evolution of the bump-on-tail instability in compressing plasma CONNOR MOONEY, NATHANIEL FISCH, PAUL SCHMIT — Using particle-in-cell simulations, the evolution of bump-on-tail instabilities in plasmas subject to one-dimensional compression is investigated. Changes in the compression history for identical initial distributions reveal that energy is not a state variable for plasmas containing resonant waves; specifically, the amount of mechanical work required to compress a plasma to a particular final state changes depending on the time-history of the compression. Such compressing plasmas enable the production of high $k\lambda_D$ waves. The final wave energy and the peak wavelength compression can be optimized by varying the compression as a function of time and the shape of the initial distribution.

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