

SI-video: A 3D visualization of the state variables S , N , and E for all data analyzed.

For each data set used to test the equation of state in the main text, the state variables S , N , E are arranged below in a 3D space of the logarithms of the state variables. If there were an obvious power law relationship between any of these variables, we would see the data collapse onto a straight line when viewed along a specific direction. Given that we do not see such a collapse, we assume that S , N , and E are not related, and we require an additional state variable to derive an equation of state.