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Solitons in Thermal Transport

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Solitons provide a significant contribution to the phonon heat flow in all one dimensional systems such as nanotubes and nanowires. Such pulses exist in both linear and nonlinear lattices. The solitons are generated whenever one end of the nanowire is attached to a noisy reservoir. For pure lattices, with neither impurities nor grain boundaries, the heat flow will not obey Fourier's Law, even for nonlinear lattices. Neither do they obey Landauer theory. We discuss several types of solitons, and describe how they are included in thermal transport.

Keywords : solitons, nanowires, nanotubes, thermal transport