Nonlinear balance laws in low temperature heat propagation

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In the talk we discuss the effects of nonlinearity and memory on the propagation of heat waves at low temperature, which are characterized by processes that are not explained by Fourier's law. The system describing these thermal properties is of quasilinear, hyperbolic type with nonlinear damping. Large-time behavior, both of smooth solutions and for Riemann problems, has been extensively studied in the p-system with linear damping. In our case the physical situation neither takes the form of a p-system nor allows linear damping.