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The classical sine-Gordon model and its hydrodynamics

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The sine-Gordon field theory is a paradigmatic integrable model that shows up in the most diverse contexts, emerging as the low-energy description of a wealth of systems. Depending on the experimental platform, the sine-Gordon realization may be close to its classical limit: this is the case, for example, in the interference pattern of two weakly-coupled quasicondensates, as it is realized in Vienna. This observation motivates us in studying the classical model.

In this talk, I will present the thermodynamics and generalized hydrodynamics of the classical sine-Gordon field theory. In the stream of the talk, I will touch several points: I will discuss why previous works based on soliton-gas picture failed to correctly capture the sine-Gordon's thermodynamics, I will show how to obtain the correct result by taking the semiclassical limit of the quantum model, and build its generalized hydrodynamics. If time permits, I will use this toolbox to discuss experimentally-motivated setups.

Primary author: BASTIANELLO, Alvise (Technical University of Munich)

Co-author: KOCH, Rebekka

Presenter: BASTIANELLO, Alvise (Technical University of Munich)

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