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Field Theoretic Description of Nonequilibrium Work Relations

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— We develop Doi-Peliti field theory for driven, interacting particles coupled to a thermal bath. This mapping of classical particles to a field theory does not require any assumption of large particle numbers or slow modes. As an application we consider nonequilibrium work relations. With the introduction of an auxiliary complex field, the Jarzynski relation emerges from the field theory as direct consequence of time reversal.

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