Instantons and self-similar scaling in a 1D spin-1 Bose gas far from equilibrium

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A system driven far from equilibrium via a parameter quench can show universal dynamics, characterized by self-similar spatio-temporal scaling, associated with the approach to a non-thermal fixed point [1-4]. The study of such universality classes may assist in a thorough investigation of many systems ranging from the post-inflationary evolution of the universe to low-energy dynamics in cold gases. Topological excitations in the system are considered to be one of the driving mechanisms of coarsening dynamics in the system and are, as such, a point of interest in the study of far from equilibrium physics. We will discuss the infrared scaling phenomena of a one-dimensional spin-1 Bose gas quenched from the polar phase to the easy-plane phase and provide evidence of the existence of instantons and their contribution to the coarsening dynamics of the system. Furthermore the dependency of the scaling exponents and the evidence of two different scaling behaviors driven by two distinct types of excitations will be presented.

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