

Abstract Submitted
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Spin-charge separation in a strongly correlated spin-polarized chain SHIMUL AKHANJEE, YAROSLAV TSERKOVNYAK, UCLA — We combine the first-quantized path-integral formalism and bosonization to develop a phenomenological theory for spin-charge coupled dynamics in one-dimensional ferromagnetic systems with strong interparticle repulsion, at low temperatures. We assume an effective spin-charge separation and retain the standard Luttinger-liquid plasmon branch, which is explicitly coupled to a Heisenberg ferromagnetic spin-wave texture with a quadratic dispersion. The dynamic spin structure severely suppresses the plasmon peak in the single-particle propagator, in both fermionic and bosonic systems. Our analysis provides an effective theory for the new universality class of one-dimensional ferromagnetic systems, capturing both the trapped spin and propagating spin-wave regimes of the long-time behavior.

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