

Abstract Submitted  
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**Factorizability and phase coherence in the anisotropic Heisenberg spin-1/2 XXZ chain in a transverse magnetic field and longitudinal Dzyaloshinskii-Moriya interaction.**<sup>1</sup> DURGANANDINI PILLARISHETTY, PRADEEP THAKUR, Savitribai Phule Pune University, Pune-411007, India — We study the entanglement and factorization properties of the Heisenberg spin-1/2 XXZ chain in the presence of a transverse magnetic field and a longitudinal Dzyaloshinskii-Moriya interaction (DMI). We use both numerical and analytic methods for the study. In the absence of the DMI, the ground state is well known to be factorizable at a certain magnetic field strength. The longitudinal DMI destroys the factorizability property; however there exists a magnetic field strength at which the many body ground state has maximal phase coherence. We discuss the connections of factorizability and phase coherence properties to the determination of macroscopic reference frames for the three independent orientations of the quantum spin or qubit degrees of freedom.

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