

Abstract Submitted
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Quantum criticality in a magnetic chain with two- and four-spin interactions in a transverse field O. F. DE ALCANTARA BONFIM, University of Portland, A. SAGUIA, B. BOECHAT, J. FLORENCIO, Unversidade Federal Fluminense — We use entanglement entropy and finite-size scaling methods to investigate the ground-state properties of a spin- $1/2$ Ising chain with two-spin (J_2) and four-spin (J_4) interactions in a transverse magnetic field (B). We concentrate our study on the unexplored critical region $B = 1$ and obtain the phase diagram of the model in the (J_4 - J_2) plane. The phases found include ferromagnetic (F), anti-ferromagnetic (AF), as well as more complex phases involving spin configurations with multiple periodicity. The system presents both first and second order transitions separated by tricritical points. We find an unusual phase boundary on the semi-infinite segment ($J_4 < -1$, $J_2 = 0$) separating the F and AF phases.

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