



Pozvánka na seminár
Oddelenia teoretickej fyziky
ÚEF SAV, v. v. i.



streda, 23. september 2026 o 11:00

Salónik ÚEF, Watsonova 47, Košice

„Connecting Ising and XY Spin-1 Quantum Physics in a Fully Frustrated Spin-1/2 Ladder“

Prednášajúca:

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Anotácia:

We investigate the ground-state phase diagram of a fully frustrated spin-1/2 Heisenberg ladder in a transverse magnetic field with an anisotropic inter-rung exchange coupling (α). An exact mapping of the fully frustrated spin-1/2 ladder onto an effective spin-1 chain shows that the anisotropy parameter (α) continuously interpolates between the Ising, XXZ easy-axis, isotropic Heisenberg, XXZ easy-plane, and XY limits of spin-1 quantum chains. Using density-matrix renormalization group calculations within a matrix-product-state framework, we characterize the resulting quantum phases through magnetization, spin correlations, and entanglement entropy. Finite-size scaling of the entanglement entropy is used to identify the critical behavior and distinguish gapped and gapless regimes. We identify six distinct ground-state phases, including rung-singlet, Néel-ordered, XY-ordered, fully polarized, Haldane, and Tomonaga-Luttinger liquid phases. We find that the Tomonaga-Luttinger liquid phase survives in the thermodynamic limit only at the fully isotropic point ($\alpha=1$), whereas the Haldane phase extends over a finite range of anisotropy around the isotropic limit.