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Entanglement scaling in the quantum Heisenberg bilayer model STEFAN WESSEL, RWTH Aachen University, JOHANNES HELMES, University of Cologne — We employ quantum Monte Carlo simulations to quantify the bipartite entanglement in the spin-1/2 quantum Heisenberg model on the square lattice bilayer in terms of the second Rényi entropy. The dependence on the interlayer coupling of the dominant area law contribution to the entanglement is analyzed, in particular its enhancement across the quantum phase transition. In addition, we study the various sub-leading logarithmic correction terms due to Goldstone excitations and corner contributions, related to the subsystem's geometry. We compare our numerical findings to previous analytical predictions and discuss limitations in extracting universal contributions due to finite size restrictions for numerical studies.

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