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# Extracting OPE Coefficients of the 3d Ising CFT from the Four-Point Function

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At its critical point, the three-dimensional Ising model is described by a conformal field theory (CFT), the 3d Ising CFT. While the critical exponents of the Ising model, which are related to the scaling dimensions of certain primary operators of the CFT, have been well-investigated in lattice calculations over the past few decades, the theory's operator product expansion (OPE) coefficients have not been accessible with traditional Monte Carlo methods. If, however, instead of carrying out simulations on Euclidean lattices we use the Quantum Finite Elements method to radially quantize critical $\phi^4$-theory on simplicial lattices approaching $\mathbb{R} \times \mathbb{S}^2$, we show in this work that not only the scaling dimensions but also the OPE coefficients of the 3d Ising CFT can be extracted from the four-point function. We obtain these quantities by measuring the four-point function of identical scalars in a special antipodal frame on $\mathbb{R} \times \mathbb{S}^2$ at different lattice refinements, fitting the data with expectations from the OPE in radial quantization, and extrapolating to the continuum. Having already shown preliminary findings at LATTICE 2022, we present our final results for the scaling dimensions $\Delta_\epsilon$, $\Delta_T$ and the OPE coefficients $f_{\sigma\sigma\epsilon}$, $f_{\sigma\sigma T}$ of the first spin-0 and spin-2 primary operators $\epsilon$ and $T$, from which also the central charge of the theory can be calculated, and compare to values obtained with the conformal bootstrap and Hamiltonian methods on the fuzzy sphere.

## Topical area

Theoretical Developments

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