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Qubit O(N) nonlinear sigma models and large charge effective field theories HERSH SINGH, Duke University — Recent work using an effective field theory (EFT) approach for conformal field theories (CFTs) in sectors of large global charges has shown that the leading behaviour of anomalous dimensions of large-charge operators can be expressed in terms of a few low-energy constants (LECs) of the EFT. By performing Monte Carlo computations using worm algorithms in a worldline formulation, we compute the anomalous dimensions of large-charge operators and extract the LECs of the $O(N)$ large-charge EFT up to $N = 8$. To alleviate the signal-to-noise ratio problem present in traditional lattice $O(N)$ formulations, we use a "qubit" formulation of the $O(N)$ model, which was recently shown to have a quantum critical point in the $O(N)$ Wilson-Fisher universality class in $(2 + 1)$ dimensions. Lattice calculations with the qubit model enable us to extract the leading LECs of the EFT. We compare against recent analytic results for the LECs from a combined large-charge and large-N expansion, and find a nice agreement.

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