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Qubitization of Quantum Field Theories

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Simulation of quantum field theories by quantum computers
requires not only the discretization of spacetime but also of field space. Naive truncations of field space break
symmetries and change the universality class of the theory, complicating the continuum limit. We discuss
how one can have finite dimensional Hilbert spaces that "fit"into a quantum computer while, at the same
time, reproducing the correct continuum physics. This is demonstrated in the solvable 1+1 dimensional O(3)
sigma-model where the qubitization is accomplished using ideas of non-commutative geometry.

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