# Causality Constraints in Conformal Field Theory

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**Abstract**

Causality places nontrivial constraints on QFT in Lorentzian signature, for example fixing the signs of certain terms in the low energy Lagrangian. In $d$ dimensional conformal field theory, we show how such constraints are encoded in crossing symmetry of Euclidean correlators, and derive analogous constraints directly from the conformal bootstrap (analytically). The bootstrap setup is a Lorentzian four-point function corresponding to propagation through a shock-wave. Crossing symmetry fixes the signs of certain log terms that appear in the conformal block expansion, which constrains the interactions of low-lying operators. As an application, we use the bootstrap to rederive the well known sign constraint on the $(\partial\phi)^4$ coupling in effective field theory, from a dual CFT. We also find constraints on theories with higher spin conserved currents. Our analysis is restricted to scalar correlators, but we argue that similar methods should also impose nontrivial constraints on the interactions of spinning operators.