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Causal measurements of quantum fields with local probes

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A recently introduced local measurement theory of quantum fields on possibly curved spacetime is the “FV framework” of Fewster and Verch [\[CMP 378, 851 \(2020\)\]](#). It is founded on the operational idea that every reasonable interaction with a quantum field of interest (system) is realised by temporarily coupling it to a probe field in a local manner. In this talk I will demonstrate the consistency of the model-independent FV framework with causality [\[PRD, 103, 025017 \(2021\)\]](#) in particular with regard to Sorkin’s impossible measurements. As a result, the FV framework equips us with a whole class of causal quantum operations, which opens the door to an investigation of fundamentally causal quantum information protocols [\[arXiv:2103.13400\]](#).

This talk reports in part on joint work with H. Bostelmann and C. J. Fewster.

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