

Plenary Talk PV V Tue 9:45 H-Aula/HS I/HS X
Local measurements of quantum fields — ●CHRISTOPHER FEWSTER — Department of Mathematics, University of York, Heslington, York YO10 5DD. United Kingdom

A standard account of the measurement chain in quantum mechanics involves a probe (itself a quantum system) coupled temporarily to the system of interest. Once the coupling is removed, the probe is measured and the results are interpreted as the measurement of a system observable. This arrangement forms a *measurement scheme* for the latter observable. Measurement schemes have been studied extensively in Quantum Measurement Theory, but they are rarely discussed in the context of quantum fields and still less on curved spacetimes. Meanwhile, algebraic quantum field theory is founded on the idea of

local observables, but their practical measurement has been left largely unexplored.

In this talk I will describe how measurement schemes may be formulated for quantum fields on curved spacetime within the general setting of algebraic QFT. This allows the discussion of the localisation and properties of the system observable induced by a probe measurement, and the way in which a system state can be updated thereafter. The framework is local and fully covariant, allowing the consistent description of measurements made in spacelike separated regions. Furthermore, specific models can be given in which the framework may be exemplified by concrete calculations.

The talk is largely based on work with Rainer Verch [Leipzig], arXiv:1810.06512; see also arXiv:1904.06944 for a summary.