# Local Algebras
A look back at the early years and at some successes and missed opportunities

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$$\mathcal{O} \longrightarrow \mathfrak{A}(\mathcal{O})$$

$\mathcal{O} =$ region in spacetime

$\mathfrak{A}(\mathcal{O}) =$ associated algebra

$$\mathfrak{R} = \text{von Neumann algebra}$$
$$\mathfrak{R}' = \text{its commutant}$$

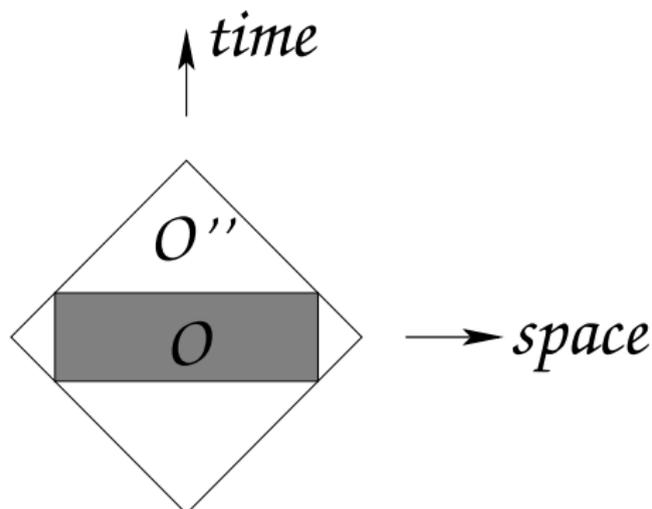$$\mathcal{O} = \text{region in Minkowski space}$$
$$\mathcal{O}' = \text{its causal complement}$$

Einstein Causality: $\quad \mathfrak{R}(\mathcal{O}') \subset \mathfrak{R}(\mathcal{O})'$
Duality: $\quad \mathfrak{R}(\mathcal{O}') = \mathfrak{R}(\mathcal{O})'$

Consequence of duality:

$$\mathfrak{R}(\mathcal{O}) = \mathfrak{R}(\mathcal{O}'')$$



$\mathcal{O}'' =$ causal completion of $\mathcal{O}$

# Gauge Strings