Events and observables in generally invariant spacetime theories

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Abstract

We address the problem of observables in generally invariant spacetime theories such as Einstein's general relativity. Using the refined notion of an event as a "point-coincidence" between scalar fields that completely characterise a spacetime model, we propose a generalisation of the relational local observables that does not require the existence of four everywhere invertible scalar fields. The collection of all point-coincidences forms in generic situations a four-dimensional manifold, that is naturally identified with the physical spacetime.

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