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Title

## **Space-Time Structuralism**

Summary

I shall expound a version of space-time structuralism, aka structural realism about space-time. The two main ingredients will be Leibniz Equivalence (but not in terms of possible worlds), and Leibniz's Principle of the Identity of Indiscernibles. I shall show how space-time points can be discerned in a variety of ways: metrically, conformally and topologically, within the confines of General Relativity, and hence Special Relativity. I shall illustrate that not all ways of discerning work in every GR-structure.

I shall argue that his version of space-time structuralism fits the Lausanne on Structural Realism, defended by Esfeld & Lam. I shall argue that this version of space-time structuralism is less metaphysical still than Pooley's 'sophisticated substantivalism', thereby satisfying a desideratum of structural realism of having less metaphysical commitments than garden-variety realism. I shall argue that this variety of space-time structuralism can be Worrall's best of both worlds, in that it is sufficiently realist to explain the phenomena, and thereby the empirical success of GR and SR, whilst not falling prey to the pessimistic meta-induction over the history of science. The transition from classical to relativistic space-time will be considered from the perspective of structuralism.

I shall address the issue of modality in space-time physics generally and in GR and SR specifically, by following Van Fraassen's slogan that 'the locus of modality is the model, not the possible world'. This is one reason why the expounded version of space-time structuralism is less metaphysical than competing varieties of space-time realism, aka substantivalism.

I shall explore worries levelled against space-time structuralism in the literature, such as of Greaves. Context and comparisons will be sought with other explorations on the subject, such as those of Bain, Dorato, Stachel and Pooley.

Finally, when time permits, I shall speculate about the possibility of having GR without space-time points, and starting *ab ovo* with structures as primitive notions, and then axiomatise them. So far, the prospects seem dim, but this seems however the only to move forward with the ontic variety of structural realism about space-time, according to which there is nothing but structure, at the fundamental level. 🍏