

# Seminar

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Duke U

## Flatly Foliated Relativity: A Stepping Stone between Special and General Relativity

Tuesday, August 22, 2017

at 15:30 h

ESI, Boltzmann Lecture Hall

**Abstract:** What if matter curved spacetime, but not space? That is, suppose the spacetime metric and matter fields minimized the same action, but with the constraint that spacetime is foliated by flat 3-dimensional Euclidean spaces. Interestingly enough, both the Schwarzschild spacetimes and FLRW cosmologies (with  $k = 0$ ) admit flat foliations, so the Big Bang and black holes still exist in this theory. On the other hand, gravitational waves do not exist in this theory. More generally, the hyperbolic Einstein equation is replaced by elliptic equations, which naturally are still nonlinear. Thus, in this theory, gravity still exists, but is transmitted instantaneously through the rigid flat slices. We present this new theory, which in some sense is  $2/3$  of the way from special relativity towards general relativity, as an interesting stepping stone for understanding general relativity better.

P. Chruściel

August 8, 2017