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Non-relativistic gravity and non-Lorentzian geometry

Wednesday 27 September 2023 10:10 (40 minutes)

I will review Newton-Cartan gravity with an emphasis on recent developments, including the covariant, off-shell large speed of light expansion of general relativity. Depending on the matter content, this expansion either leads to Newton-Cartan geometry with absolute time or to Newton-Cartan geometry with non-relativistic gravitational time dilation effects. The latter shows that non-relativistic gravity includes a strong field regime and goes beyond Newtonian gravity. Earlier work on Newton-Cartan geometry will be briefly discussed, after which we turn to modern approaches. Finally, I will mention matter couplings, solutions and odd powers in 1/c, as well as a summary of related topics. The latter includes consideration of the opposiite limit in which c is very small, along
with applications of non-Lorentzian geometry to string theory and AdS/CFT.

Presenter: OBERS, N. (Nordita)

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