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## Chern-Simons-like Theories of Gravity

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# Chern-Simons-like Theories of Gravity

Wout Merbis, 26 September 2014

- In three space-time dimensions, all known ghost-free higher-derivative massive gravity theories may be formulated as a Chern-Simons-like theory.  
Chapter 3
- The presence of secondary constraints in Chern-Simons-like theories of gravity is intrinsically related to the presence of invertible fields in the theory.  
Chapter 4.2.2
- Unlike in New Massive Gravity, in Zwei-Dreibein Gravity with anti de-Sitter boundary conditions, a positive boundary central charge is consistent with positive mass and energy for the massive spin-2 mode in the bulk.  
Chapter 5.4.3
- Topologically Massive Gravity in its Chern-Simons-like formulation can be extended to Minimal Massive Gravity, such that the boundary central charge is positive for positive energy and mass in the bulk.  
Chapter 6
- It is possible to define higher-derivative theories of 3D gravity which are free of scalar ghost excitations and consistent with a holographic c-theorem, but this does not immediately imply a unitary theory.  
Chapter 7.3 and 7.4
- The presence of logarithmic AdS-wave solutions in Zwei-Dreibein Gravity at a critical point in its parameter space further supports the conjecture that its dual theory is a logarithmic conformal field theory.  
Chapter 8.3
- The more I learn, the more I realize how many things there are which we don't know. Therefore it seems very likely to me that the wisest of all men know that they know nothing.
- The act of understanding nature is in some way unnatural to us, as the ideal scientist should be devoid of any bias, but scientists are humans and human beings are inherently biased.
- If any sufficiently advanced technology is indistinguishable from magic, then any sufficiently advanced mathematical physics paper is indistinguishable from a grimoire.
- Even if you believe climate change is a hoax and does not need to be acted upon, this still does not justify opposing a clean and sustainable world.