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Sujet de mémoire

The fluid/gravity correspondence for two-dimensional fluids

In a particular long wavelength limit, Einstein's equations with a negative cosmological constant reduce to the equations of relativistic fluid dynamics (which are the relativistic generalisation of the famous Navier-Stokes equations [1]). This relation is known as "fluid/gravity correspondence" [2] and it has been recently extended also to Einstein's equations without cosmological constant. As discussed in [3], in a spacetime with only 2+1 dimensions the previous relations drastically simplify, allowing one to discuss analytically several aspect of the correspondence that are out of reach in spacetimes with four and more dimensions. The goal of the master project is to rederive the results of [3] in the Chern-Simons formulation of three-dimensional Einstein gravity [4]. In this context, gravity is described as a gauge theory and this brings two advantages: the computation of the relevant quantities simplifies and one can extend the findings to generalised gravitational theories, like those involving also fields of spin greater than 2 .

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References

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