

March 19th, 2022

### Report on the thesis

#### “Thermodynamic methods for relativistic hydrodynamics”, by Lorenzo Gavassino.

I must say upfront that I am a relativist but I am not at all competent on relativistic hydrodynamics. Therefore I am not capable of providing a thoughtful evaluation of the full scientific content of this thesis. I have nevertheless accepted the invitation to write a report on Lorenzo Gavassino’s thesis because a couple of years ago I stumbled upon his paper *The zeroth law of thermodynamics in special relativity* [L. Gavassino, Foundations of Physics 50 (2020)] and I was extremely surprised by it. My understanding is that this paper gives an impressively clear and convincing version of the solution to the old imbroglio, that goes back to Planck and Ott, on the special relativistic transformation of thermodynamical quantities. I was so impressed that I felt obliged to reach out to Lorenzo and congratulate.

Having accepted to review Gavassino’s thesis, I am pleased to have found the same brilliant clarity in the way relativistic hydrodynamics and its thermodynamical aspects are introduced and treated in the thesis. For an outsider like me, this thesis is a crystal clear introduction, much better than so many other confused introductions with which I had struggled in the past.

This is therefore an incomplete evaluation, but for what I can see Lorenzo Gavassino is one of those rare scientists capable of thinking through problems in depth and in detail, and find clarity where it is lacking. On this basis, I expect him to become a first class scientist, and I very much appreciate and approve his thesis.

In conclusion, it is my opinion that this thesis should definitely be admitted to a public defence.



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