Nothing Beats Nothing for Avoiding Vacuum Catastrophes

Terry Bollinger
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https://www.youtube.com/watch?v=PhfqdBk8qxk&lc=UgyCX9LVINKvLWpFSYV4AaABAg

A Comment on the YouTube Sabine Hossenfelder post:
What is "Nothing"?
https://youtu.be/PhfqdBk8qxk

The worst scientific prediction in history is quantum field theory's claim that the vacuum has so much energy that the universe should instantly collapse or explode. The source of this failure is assuming that the "nothing" between interacting particles is identical to the "nothing" of special relativity. They are, in fact, irreconcilably different versions of "nothing." The solution to the vacuum density problem is to admit the mismatch and return to Einstein's original special relativity concept of the vacuum as independent of any frame.

Quantum field theory is possibly the most precise and predictive theory set ever devised, yet its very success obscures a critical point: It is an ether theory in the sense that the context of its particles, energized fields, and endpoints always bind its results to a well-defined and entirely classical inertial frame. Whether used to calculate the Lamb shift in a hydrogen atom or the path of a photon in a Feynman diagram, every quantum field theory calculation begins and ends with the assumption that classical entities exist with well-defined locations in space and time — in other words, a well-defined inertial frame. These inertial frame boundaries make all variants of quantum field theory into ether theories, that is, theories for which a specific inertial frame dominates over all others.

Einstein's 1905 papers on special relativity did not do this. Einstein, at least in 1905, was so excruciatingly careful not to make frame-dependent, ether-like statements about the vacuum that he refused to define even the speed of light as having meaning except in the context of a single observer in a well-defined inertial frame — and even then only as the *average* of light going out and then returning to that observer.

In his must-read book *The Structure of Scientific Revolutions*, the late and truly great science philosopher Thomas Samuel Kuhn defined two types of science. In *normal science*, extraordinary past successes generate deep confidence that, despite anomalies here and there, the current framework must inevitably resolve those anomalies, even if those resolutions prove extraordinarily difficult to uncover. In *revolutionary science*, those anomalies provoke a crisis in which a new generation of thinkers loses confidence in the old model and begins examining deeply held and seemingly "obvious" assumptions that underlie that model.

The vacuum density problem is just such an anomaly. What is remarkable is that the simple assumptions that generated this anomaly have gone unchallenged for so long.

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