Review of: "Electromagnetism Might Be the Source of Most of the Dark Energy"

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Potential competing interests: No potential competing interests to declare.

This paper by Moshe Segal claims that dark energy comes from destructive interference of EM waves. Before going further into some more details, I would recommend reading the Nobel lecture 2011 (available via the Nobel Foundation) by Perlmutter et al., “for the ACCELERATED expansion. of the universe.”

Now, coming to the claim of the author: one way to analyze it is to use S-parameters for a two-port (e.g., some transmission line with a generator on the left side and one on the right side).

The author uses the example of a transmission line or free space fed with two EM waves travelling in antiphase in the same direction, and the resulting electric and magnetic field strength is zero everywhere.

The catch is how to feed the energy into the transmission line. For this example, this is typically done with a 0/180 deg hybrid; assuming that everything is lossless, the power for this case is reflected back to the generator(s) or transferred to the sum port of the 0/180 deg hybrid.

A nice subject for my next RF lab (next week) and letting the students find out.

Of course, there is always conservation of energy, and there are no miracles, similar to the superposition in phase of two homogeneous plane waves which DO NOT result in twice the field strength and thus 4 times the power. (One has to use the S-matrix rules systematically and correctly.)

That's it.