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Peer Review

# Review of: "A Hollow Black Hole"

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While the construction presented in this manuscript is interesting, I do not see how one can accommodate such a construction in general relativity. In the limit where this construction can be modeled as a spherically symmetric shell, it appears to contradict well-established results in general relativity, such as the Jebsen-Birkhoff theorem for spherically symmetric solutions. At the same time, this construction does not avoid a singularity in general relativity, as the black holes comprising the horizon would each contain a singularity as a consequence of the Penrose-Hawking singularity theorems. While these theorems may be avoided in modified gravity theories or with energy condition violations, there is no explicit mention of alternatives to general relativity or energy conditions in the manuscript.

I have two other remarks: In general relativity and gravitation, a black hole is not characterized by a singularity as asserted in the abstract (regular black holes violating energy conditions have been considered in the literature), but by the presence of an event horizon. Thin shells, which are characterized by a delta function singularity at the surface of the shell, are already a widely used construction in general relativity (see the book “A Relativist's Toolkit” by Poisson for a discussion).

## Declarations

**Potential competing interests:** No potential competing interests to declare.



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