

Abstract Submitted  
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**Orbiting radiation Stars** GABE PEREZ-GIZ, AAAS, Washington DC, DEAN FOSTER, Amazon, New York, NY, JOHN LANGFORD, Microsoft Research, New York, NY — We study a spherically symmetric solution to the Einstein equations in which the source, which we call an orbiting radiation star (OR-star), is a compact object consisting of freely-falling null particles. The solution avoids quantum scale regimes and hence neither relies upon nor ignores the interaction of quantum mechanics and gravitation. The OR-star spacetime exhibits a deep gravitational well yet remains singularity free. In fact, it is geometrically flat in the vicinity of the origin, with the flat region being of any desirable scale. The solution is observationally distinct from a black hole because a photon from infinity aimed at an OR-star escapes to infinity with a time delay.

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