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**Comparing Black hole Shadow Widths in the Equatorial Plane for General Relativity and Selected Alternative Theories of Gravity** JAMES GRABER, Library of Congress — Results from ongoing efforts to measure the black hole shadows expected from Sgr A* and M87, e.g. by the Event-Horizon Telescope, could soon confirm or refute the Kerr nature of the black-hole shadow, thereby helping confirm or refute General Relativity. It is fairly easy to precisely calculate the width of the shadow of a compact, cylindrically symmetric rotating object in its equatorial plane. We have calculated these shadow widths for three different metrics: 1) the standard Kerr metric, 2) a rotating perturbed Kerr object with a quadrupole moment similar to a neutron stars, as computed by Frutos-Alfaro based on the earlier Manko et al. neutron-star metric, and 3) also for a new rotating metric based on the Yilmaz exponential metric. For reasonable (plausible) parameter values, the differences in calculated shadow widths are of the order of ten percent, which may be difficult to measure. We graphically present comparisons between the expected Kerr value for the shadow width, and the widths computed for the alternative metrics as a numerically computed function of the rotation and the quadrupole moment. If time allows, we may present similar calculations and graphs for the shadow widths of rotating compact objects from other alternative theories of gravity.

James Graber
Library of Congress

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