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The Black Hole Photon Ring

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The photon ring is a narrow ring-shaped feature, predicted by General Relativity but not yet observed, that appears on images of sources near a black hole. It is caused by extreme bending of light within a few Schwarzschild radii of the event horizon and provides a direct probe of the unstable bound photon orbits of the Kerr geometry. The precise shape of the observable photon ring is remarkably insensitive to the astronomical source profile and can therefore be used as a stringent test of strong-field General Relativity. A space-based interferometry experiment targeting the photon ring of M87* could test the Kerr nature of the source to the sub-sub-percent level.

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