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Observing naked singularities by the Event Horizon Telescope

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Horizonless compact objects may produce phenomenological features which distinguish them observationally from black holes. In particular, the images of the accretion disks around them possess a characteristic morphology including a series of central bright rings instead of a black hole shadow. We demonstrate how the central ring structure arises relating it to the behavior of the deflection angle on the scattering geodesics and the light ring structure of the spacetime. Focusing on two classes of reflective naked singularities we further discuss whether the central rings can be observed by the present and near-future Event Horizon Telescope (EHT) arrays. While they may be hard to be distinguished by the current capacities, the next-generation EHT will be able detect them as qualitative deviations in the image morphology.

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