



galaxies



Special Issue Reprint

From Vision to Instrument: Creating a Next-Generation Event Horizon Telescope for a New Era of Black Hole Science

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In April 2019, the Event Horizon Telescope Collaboration successfully imaged the first supermassive black hole (M87*), opening a new era in detailed study of these exotic objects. By sharply enhancing the capabilities of black hole imaging, the next-generation EHT (ngEHT) is poised to again revolutionize our view of horizon-scale physics. The ngEHT will enable the first movies of black hole accretion, produce high-dynamic-range images that connect black holes directly to their galactic-scale relativistic jets, and bring into range a larger population of black holes and explosive transients to explore. This Special Issue develops the key science drivers and architecture of the ngEHT. The contributions sharpen the ngEHT scientific vision and implementation by illuminating and proposing new possibilities in the following areas: Fundamental physics; Black holes and their cosmic context; Accretion; Jet launching; Transients and impulsive phenomena; Algorithms and inference; History, philosophy, and cultural implications of building new instruments in the current era; Advances in submillimeter VLBI instrumentation; VLBI array design and optimization



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