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LISA: Our infrasonic ear to the universe

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The Laser Interferometer Space Antenna (LISA) is a space mission proposed by NASA and ESA for detecting gravitational-wave signals in the sub-milli-hertz to deci-hertz band. LISA will observe a myriad of sources, from galactic compact binaries in our galaxy to supermassive black hole mergers at cosmological distances. In the process, it will map the distribution of the galactic binary population, perform tests of strong gravity, and provide an independent estimate of the Hubble constant. In addition to discussing how LISA will achieve these goals, I will address the primary challenges facing LISA phenomenology, such as (1) the problem of detecting signals from individual sources while battling the source confusion noise from thousands of galactic binaries and (2) modeling the evolution of extreme mass-ratio binary inspirals. I will conclude by discussing the unique role LISA will play in complementing other observatories of the time in pursuit of some interesting astrophysical discoveries.