The scientific potential of third-generation gravitational-wave detectors
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The discoveries of gravitational waves from binary black hole and binary neutron star coalescences suggest these sources will be observed in large numbers by currently operating advanced detectors. Thanks to these observations, individual systems and the underlying population can be characterized. However advanced detectors will only be sensitive to sources within a redshift of \( \sim 1 \). By contrast, the next generation of ground-based instruments, such as the Einstein Telescope and Cosmic Explorer, will access a large fraction of the universe. These observatories will, for example, detect \( 10^5 \) binary black holes per year, many of which with large signal-to-noise ratios, up to redshift of \( \sim 10 \). At the same time, these new instruments will significantly increase the probability of detecting rare or weak sources. In this talk I will describe the scientific potential of proposed third-generation gravitational-wave detectors.