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Interferometric Gravitational Wave Detectors: Current State and Development Prospects

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Abstract. Ten years ago, in September 2015, the Laser Interferometer Gravitational-Wave Observatory (LIGO) detectors first detected gravitational waves from the collision and merger of two black holes. The LIGO detectors, joined by the European Virgo detector and the Japanese KAGRA detector, are currently in their fourth observing run. In the first three runs, gravitational waves generated by the merger of compact space objects far from Earth were registered 90 times. In the fourth observing run, more than 200 events have already been identified, which after additional careful studies will be recognized with a high degree of probability as registered gravitational waves from cosmic sources. The lecture examines the design of modern gravitational-wave interferometers, analyzes the factors that determine their sensitivity, and examines ways and methods of increasing the sensitivity of both currently operating and new generation more sensitive gravitational-wave detectors that are being designed.