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The Advanced LIGO Detectors and the Detection of Gravitational Waves

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On February 11, 2016 LIGO announced to the world the first direct detection of gravitational waves which were made by their two observatories at Hanford, Washington and Livingston, Louisiana. These gravitational waves were generated by the inspiral and coalescence of a pair of stellar mass black holes. Since the first detection three more black hole binary mergers have been reported: two by the LIGO detectors alone and one by the LIGO detectors and the VIRGO detector which had recently come on line. In this talk the speaker will discuss the experimental challenges which had to be faced to reach the sensitivity required for detections to be made, with the focus of the talk on several of the Advanced LIGO optical and laser subsystems.