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The Progress and Promise of Advanced LIGO

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The three initial, and later enhanced, LIGO gravitational wave detectors in the Livingston, Louisiana and Hanford, Washington observatories collected over one year of triple coincidence data at or better than the initial LIGO design sensitivity during science runs from 2005 to 2010. Astrophysical population estimates placed the detection rate for the initial LIGO detectors at 1 every 10 years, so it was not surprising that these instruments did not make a detection. The Advanced LIGO interferometers have been designed to be a factor 10 more sensitive than the initial detectors, which will increases the volume searched by a factor of 1000. These upgrades are expected not only to provide that first, elusive detection, but we hope to also allow for routine detections, and thus to usher in an exciting age of gravitational wave astronomy. Installation of the Advanced LIGO interferometers began two years ago and it is now more than half complete. We will present an overview of the Advanced LIGO detectors, as well as the current status of the installation. We will also go over some of the exciting science that these detectors, combined with other next generation gravitational wave detectors around the world, hope to accomplish once completed.