The Next Generation of Ground-based Gravitational Wave Detectors

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LIGO, Virgo and GEO600, the first generation long-baseline interferometric detectors of gravitational waves, were taking data up until last fall. The analysis of the data collected is in progress and the first detection might be possible with these instruments. But, more sensitive detectors will be needed to start the field of gravitational wave astronomy.

Advanced interferometers will improve the sensitivity by a factor of ten, thus enabling the exploration of a universe volume that is 1000 times larger than the present. The technology is almost ready and the construction of Advanced LIGO and Advanced Virgo is planned to start at the beginning of the next decade. With an expected event rate of 1/week-1/day these detectors will be powerful instruments that will provide a new way of observing the universe.

As an intermediate step, in 2008 LIGO and Virgo will start the upgrade of the current detectors, working towards Enhanced LIGO and Virgo+. GEO600 has also planned a set of incremental upgrades (GEO HF) in order to enhance sensitivity in the high frequency range.

In this talk the path towards the advanced detectors will be reviewed and the perspectives of the so-called 2nd generation long-baseline interferometers will be outlined.