Paper ID: 52736
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IAF SYMPOSIUM ON FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS (A7)
Space Agency Strategies and Plans (1)

Author: Mr. Vishal Singh
University of Petroleum and Energy Studies, India, singhvishal0103@outlook.com

Ms. Aishwerya Singh
University of Petroleum and Energy Studies, India, aishwerya1@gmail.com

MODIFICATIONS IN LIGO(LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY)

Abstract

Gravitational waves are emitted in the form of a strong burst of energy when a pair of black holes orbiting around each other lose energy, gradually approach each other and then finally collide at nearly one-half the speed of light and form a single more massive black hole. They can pass through any intervening matter without being scattered, can penetrate regions of space that electromagnetic waves cannot, can exist at any frequency. These feature allows G-Waves to carry information about astronomical phenomena observed never before, so the detection of G-waves is a milestone in the history of Physics. As of now used detection technique can further be ameliorated. Curved interferometers will be used instead of straight one which is very hard to build and maintain, use of the phenomenon of total internal reflection, which will let the laser light pass via curved cable. Dielectric mirrors will be used which are perfect reflectors. Isolated environment will be created with the help of dynamic vibration absorber so that other external vibrations cannot interfere the functioning of the interferometer. The Advanced LIGO project will completely upgrade the three U.S. gravitational wave interferometers, bringing these instruments to sensitivities that should make gravitational wave detections a routine occurrence. Using the initial LIGO design as a point of departure with a signal-recycling mirror at the output "dark" port allows the gravitational wave induced at sidebands to be stored. Initial LIGO uses 25-cm, 11-kg, fused-silica test masses, the fused silica test mass optics for Advanced LIGO are larger in diameter (34 cm) to reduce thermal noise contributions and more massive (40 kg) to keep the radiation pressure noise to a level comparable to the suspension thermal noise. Through the combination of the seismic isolation and suspension systems, the required control forces on the test masses will be reduced by many orders of magnitude in comparison with initial LIGO, reducing also the probability of non-Gaussian noise in the test mass.