SES10-2010-000064

Abstract for an Invited Paper
for the SES10 Meeting of
the American Physical Society

LISA Overview

GUIDO MUELLER, University of Florida

The Laser Interferometer Space Antenna (LISA) will complement the ground-based interferometric gravitational wave detectors such as LIGO and VIRGO the same way infrared telescopes complement optical telescopes. LISA will measure gravitational waves in the mHz frequency range where for example super-massive black hole mergers release most of their energy. It will consist of three spacecraft in a heliocentric orbit trailing earth by 20 deg. The three spacecraft will be separated by 17s light travel time and will form a near equilateral triangle. Two subsystems form the core of LISA. Free falling proof masses inside each spacecraft will be used as gravitational reference sensors (GRS). The residual forces on these proof masses will have to be in the order of fN/rtHz in the LISA band. The interferometry measurement system (IMS) will measure changes in the distances between these free falling proof masses with pm/rtHz sensitivity. I will briefly describe the overwhelming science case for LISA, discuss the GRS and the status of the LISA Pathfinder (LPF) mission which is scheduled to launch late 2012. LPF's only purpose is to test this subsystem for LISA. I will then focus on the IMS, present the concept and discuss ongoing experimental research in the US and in Europe.