

LSC Six-Month Progress Report

LIGO-M010085-00-M

Organization Inter-University Centre for Astronomy and Astrophysics (IUCAA)

Report Date 02/15/2001

Item 8

During the past few months the IUCAA Gravitational Wave Data Analysis group has been involved in two tasks:

1. An effort has been made to extend the hierarchical search of Mohanty and Dhurandhar to include another parameter - the time-of-arrival. Since the coalescing binary chirp has dominant power at low frequencies, this property can be used to advantage by cutting off the high frequency part of the waveform, down sampling it and still retaining about 80 to 90 percent of its signal-to-noise. This procedure still retains a significant factor of the gain in the hierarchy in the masses and moreover adds an extra gain factor which results from the down sampling. This method has been applied so far to the simpler Newtonian chirp - only one mass parameter - and the saving in the computational cost was estimated to be by a factor between 40 and 50. It is expected that for the post-Newtonian chirp the cost saving factor will be increased to about 150. This work is in progress. The people involved in this work are Anand Sengupta, Sanjeev Dhurandhar, Albert Lazzarini and Tom Prince.
2. Immediately after the LSC meeting of August 2000, a working group was set up to investigate the problem of network analysis - detecting and observing gravitational wave sources with a network of detectors. A. Pai, S. V. Dhurandhar and S. Bose (now in AEI, Potsdam, Germany) have written a paper on detecting inspiraling binaries with a network of detectors using maximum likelihood methods. This paper has now been accepted for publication. It is possible that the work in this paper could be useful in writing computer codes for the problem mentioned above.