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Astronomical Society of South Australia

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Notice of a **Joint Meeting**
at **8 pm** on **Wednesday September 5th 2012**
in the **Kerr Grant lecture theatre**,
Physics building, University of Adelaide

Note: For security reasons the doors will be locked at 8 pm.
Drinks and a light supper will be available after the meeting.
All welcome.



**“Gravitational Wave Astronomy
- Opening a New Window on the
Universe”**

by *Dr David Ottaway*

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Abstract:

Gravitational waves are a direct consequent of Einstein’s highly successful Theory of General Relativity. These perturbations of “space-time” are extremely difficult to detect and Einstein himself thought that they would never be detected. However since this theory was proposed we have seen the discovery of black-holes and neutron stars and the invention of the laser. These developments make the detection of gravitational waves plausible. However, it has taken a further 50 years for the technology to develop such that gravitational wave detection is highly likely.

The era of gravitational waves astronomy has already begun. The LIGO and VIRGO collaborations have successfully operated three first generation gravitational wave detectors for a number of years. This international network of gravitational wave detectors has already published over 60 papers which report on the upper limits on the emission of gravitational waves from a host of astrophysical objects. This has already constrained the physical parameters of these objects.

Five advanced gravitational wave detectors located in USA, Italy, Japan and India are already under construction. These detectors promise a sensitivity increase of a factor of 10 which will increase the volume of space that can be sensed by 1000 making the direct detection of gravitational waves extremely likely.

In this talk I will introduce the concepts of general relativity and gravitational waves. I will also describe the instruments that are designed to detect them and some of the exciting astrophysics that has already been done.