

Citation for the 2019 RAS Eddington Medal: Professor Bernard Schutz

Professor Bernard Schutz is awarded the Eddington medal for his theoretical discovery that gravitational waves can be used to measure the cosmic expansion rate.

Professor Bernard Schutz is a theoretical astrophysicist who has worked on relativistic astrophysics and gravitational waves for over four decades. He pioneered the analysis of data from interferometric gravitational wave detectors, paving the way for the analysis pipelines that are at now at the heart of searches for gravitational waves in the Laser Interferometer Gravitational Wave Observatory (LIGO) and Virgo.

In 1986 Prof. Schutz realized that gravitational waves emitted when compact binary systems merge contain the signature not only of the energy flux (or apparent luminosity) of the source but also of its absolute luminosity. As a result, gravitational waves can be used as standard candles (or, more appropriately, as standard sirens). This theoretical discovery offered the prospect of measuring Hubble's constant directly, whenever a gravitational wave is accompanied by an electromagnetic counterpart, bypassing the traditional cosmic distance ladder method.

Thirty years later, Prof. Schutz's proposal was put into practice when both gravitational and electromagnetic waves were detected by LIGO from the binary neutron star coalescence event, GW170817. The resulting direct measurement of Hubble's constant is not as accurate as other measurements, but future discoveries of gravitational waves will make this an accurate method for directly measuring the expansion rate of our universe at different cosmic epochs.

For these reasons, Professor Bernard Schutz is awarded the Eddington Medal.