

Seminarium Astrofizyczne

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Prof. Martin Hendry

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Gravitational-Wave Cosmology in the 2030s: opportunities and challenges

For several decades it has been recognised that the mergers of compact binary coalescence events can serve as standard sirens – the gravitational wave (GW) analog of standard candles – and recently analysis of the first GW catalogues compiled by the LIGO, Virgo and KAGRA collaborations has begun to turn standard sirens into a practical cosmological probe with the potential to bring important new insights to the Hubble tension. Looking beyond the current generation of ground-based GW detectors, in the 2030s ground- and space-based facilities such as LISA and the Einstein Telescope offer the prospect to take standard sirens to a new level, probing cosmological parameters beyond the Hubble constant and perhaps exploring and constraining more exotic models beyond Concordance cosmology. However, GW cosmology with next generation detectors will also bring some additional challenges, due to the influence of potential systematics arising from the sheer number and redshift distribution of sources that will be accessible. In this talk I review the short history of GW cosmology with standard sirens to date, discuss some of the opportunities and challenges that lie ahead with the next generation of GW detectors, and consider how these challenges might be overcome.

Martin Hendry is Professor of Gravitational Astrophysics and Cosmology at the University of Glasgow, where he is also Clerk of Senate and Vice Principal of the University. His main research interests are in cosmology, gravitational-wave astrophysics and gravitational lensing. He is a senior member of the LIGO Scientific Collaboration who, with their colleagues in the Virgo Collaboration, made the first ever detection of gravitational waves in 2015 – a discovery awarded the 2017 Nobel Prize for Physics. Martin is a Fellow of the Institute of Physics and is also a Fellow (and currently Vice-President) of the Royal Society of Edinburgh, Scotland's National Academy.

Serdecznie zapraszam,
William Pearson, on behalf of the SOC