

How Can Nuclear Astrophysics Benefit from Detections of Gravitational Waves?

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I will very briefly review the history of LIGO and VIRGO observations of gravitational waves (GW) in the recent past. I will also give an astronomical background: tally possible sources of these gravitational waves (mainly compact binary coalescences, both black hole - black hole and neutron star - neutron star binaries) and expected annual rates of detections of GWs from these sources. I will focus on the observation of GW170817 where both GWs and electromagnetic counterparts were observed [1]. This is the first event that sheds some light on nuclear astrophysics. I will emphasize some of the contributions of our LIGO group at Eotvos University to the analysis of this event, and conclude with some of the findings of the LIGO-VIRGO collaboration about neutron stars.

[1] LIGO Scientific Collaboration and Virgo Collaboration, Fermi GBM, INTEGRAL, Ice-Cube Collaboration, AstroSat Cadmium Zinc Telluride Imager Team, IPN Collaboration, The Insight-Hxmt Collaboration, ANTARES Collaboration, The Swift Collaboration, AGILE Team, The 1M2H Team, The Dark Energy Camera GW-EM Collaboration and the DES Collaboration, The DLT40 Collaboration, GRAWITA: GRAVitational Wave Inaf TeAm, The Fermi Large Area Telescope Collaboration, ATCA: Australia Telescope Compact Array, ASKAP: Australian SKA Pathfinder, Las Cumbres Observatory Group, OzGrav, DWF (Deeper, Wider, Faster Program), AST3, and CAASTRO Collaborations, The VINROUGE Collaboration, MASTER Collaboration, J-GEM, GROWTH, JAGWAR, Caltech- NRAO, TTU-NRAO, and NuSTAR Collaborations, Pan-STARRS, The MAXI Team, TZAC Consortium, KU Collaboration, Nordic Optical Telescope, ePESSTO, GROND, Texas Tech University, SALT Group, TOROS: Transient Robotic Observatory of the South Collaboration, The BOOTES Collaboration, MWA: Murchison Widefield Array, The CALET Collaboration, IKI-GW Follow-up Collaboration, H.E.S.S. Collaboration, LOFAR Collaboration, LWA: Long Wavelength Array, HAWC Collaboration, The Pierre Auger Collaboration, ALMA Collaboration, Euro VLBI Team, Pi of the Sky Collaboration, The Chandra Team at McGill University, DFN: Desert Fireball Network, ATLAS, High Time Resolution Universe Survey, RIMAS and RATIR, and SKA South Africa/MeerKAT, The Astrophysical Journal Letters, **848**, L12 (2017).