

Discovery of the First Electromagnetic Counterpart to a Gravitational Wave Source

Ryan J. Foley, University of California at Santa Cruz

Giffels Auditorium

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Free and open to the Public—Reception after the lecture

On August 17, LIGO and Virgo made the first detection of a binary neutron star merger, GW170817. Two seconds later, an associated gamma-ray burst was detected by Fermi and INTEGRAL, GRB 170817A. Soon after sunset in Chile, my team, the One-Meter, Two-Hemispheres (1M2H) collaboration, used the 1-m Swope telescope at Las Campanas Observatory to discover the optical counterpart, Swope Supernova survey 2017a (SSS17a). In this talk, I will tell the tale of this discovery. I will also describe our observations taken over the next several weeks/months. With our electromagnetic data alone, we are able to independently and definitively say that GW170817 came from the merger of a binary neutron star system. These data show that a significant amount of r-process material was generated and ejected in the merger -- a so-called 'kilonova' -- providing enough material to solve the question of where the majority of r-process elements are created. Examining the host galaxy, we find that the progenitor system was likely several Gyr old. This data-rich event is just the beginning. GW170817 and SSS17a herald the beginning of a new era of astronomy.



(Image credit: 1M2H Team/UC Santa Cruz
& Carnegie Observatories/Ryan Foley)



Ryan Foley received his PhD from UC Berkeley
He is a Sloan Fellow, Packard Fellow & Kavli Fellow