

On Aug 17, 2017, the LIGO and VIRGO collaboration has directly observed gravitational waves from the neutron star binary system. This event was also observed with hundreds of optical telescopes and started a new era of multi messenger astrophysics. Even though the total signal-to-noise ratio of this event was 30, we could extract only limited amount of information about the neutron star equation of state from the signal. This is due to the diminished interferometer response above 400 Hz. In this talk I will discuss a research direction for the next generation of the gravitational-wave detectors which promise a significantly improved sensitivity above 1 kHz. These instruments have the potential to observe neutron star post-merger oscillations at a rate of ~ 30 events per year with a signal-to-noise ratio of 5 or more.