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Effect of Distance-Inclination Angle Degeneracy on Hubble-Lemaitré Constant Measurement ARNAB DHANI, ANURADHA GUPTA, Pennsylvania State University, ARCHISMAN GHOSH, University of Amsterdam, SOURABH JHA, Rutgers University, B SATHYAPRAKASH, Pennsylvania State University — The discovery of GW170817 and its electromagnetic counterparts allowed the first independent measurement of Hubble-Lamaitré constant (H_0) using gravitational waves (GWs). Such H_0 measurement, in the local universe, requires the correct estimation of the binary's distance from its GW signal and the redshift information of the host galaxy from optical observations. Though the measurement of host's redshift, if identified correctly, can be very accurate (within $\sim 1\%$ error), the distance estimates through GWs suffer from large uncertainties mainly due to distance-inclination angle ($D_L - \iota$) degeneracy, hence, affecting the H_0 measurements. In this presentation, we exploit this degeneracy to constrain H_0 effectively. The distance posterior is asymmetric due to $D_L - \iota$ degeneracy and leads to an asymmeteric joint H_0 posterior for a population of binary neutron star (BNS) mergers. This results in uneven credible intervals measured from the maximum likelihood estimator of the H_0 posterior, left error bar being smaller than the right error bar. Using this feature of joint H_0 posterior, we show that the advanced LIGO-Virgo detector network will need only ~ 30 BNS mergers (with counterparts) to rule-out Plank Collaboration's H_0 estimate.

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