Poster Session #D
Binary sources of Gravitational Waves and cosmology

D14

Gravitational wave cosmology with extreme mass-ratio inspirals

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The Laser Interferometer Space Antenna (LISA) will open the mHz frequency window of the gravitational wave (GW) landscape. Among all the new GW sources expected to emit in this frequency band, extreme mass-ratio inspirals (EMRIs) constitute a unique laboratory for astrophysics and fundamental physics. We investigate the prospect of using the loudest EMRIs detected by LISA as dark standard sirens, statistically matching their sky localisation region with mock galaxy catalogs. Assuming a ΛCDM model we obtain constraints on the Hubble constant at the 1% (4%) level at 90% confidence level in our best (worst) case scenario, while assuming a time-evolving dark energy equation of state we show that in our best (worst) case scenario the equation-of-state parameter w0 can be measured with 6% (12%) accuracy at 90% confidence level. EMRI measurements will be affected by different systematics compared to both electromagnetic and ground-based GW observations, hence they will be of great importance for cosmology, providing additional independent validation of our present understanding of the Universe.