Abstract Submitted
for the APR21 Meeting of
The American Physical Society

**Graviton Mass Constraint From LISA Compact Binary Catalogues** GARY A. LAMOTTE, SHANE L. LARSON, CIERA Northwestern — General Relativity predicts that gravitational waves (GWs) travel at the speed of light c. Bounds on the speed with which GWs propagate can be expressed in the context of the time of flight for the graviton, the particle which carries the gravitational force. Experimental measurements can be performed with LISA to compare light propagation speed vs GW propagation speed. This would be done utilizing eclipsing white dwarf binaries such as J0651 or ZTF J1539. The phase of the light curve would be compared to the GW phase determined by LISA to see if a phase difference is present. A phase difference would imply a non-zero graviton mass and thus favor certain quantum theories of gravity. No phase difference would be consistent with a graviton mass of zero, be in agreement with General Relativity and additionally would constrain the possible maximum mass within certain bounds. Simulated galaxies using the COSMIC population synthesis code are used to produce simulated LISA catalogues of white dwarf binaries. The properties of the simulated catalogue are used to model the accuracy of GW and electromagnetic observations to understand how well the graviton mass can be bounded from expected observations.

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Date submitted: 07 Jan 2021 Electronic form version 1.4