Abstract Submitted
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Constraining the properties of dark matter particles through gravitational wave observations of Binary Black Hole mergers in Advanced LIGO DIVYA SINGH, SARAH SHANDERA, DONGHUI JEONG, CHAD HANNA, RYAN MAGEE, TOWSIFA AKHTER, MICHAEL RYAN, Pennsylvania State University, LVC COLLABORATION — Dissipative dark matter models predict the formation of Dark Black Holes through sufficient cooling and collapse of dark matter halos in the universe. Such black holes could form binary systems that could merge and emit gravitational waves. Binary Dark Black Hole systems with merger times shorter than the age of the universe could be observed with existing and future gravitational wave detectors. In [1], Shandera et al estimated the expected event rates for dark black hole mergers that could be observed by Advanced LIGO and the Einstein Telescope for a range of dark black hole model parameters. Here, we wish to constrain the properties of dark matter particles like the dark proton mass, dark electron mass, etc. using the observed / reported event rates from Advanced LIGO for binary black hole systems in the sub-solar mass range. We explore how the mass distribution of these binary systems is related to the merger times and event rates observed with LIGO, which can in turn help us constrain the parameters of the model. [1] Shandera, Sarah & Jeong, Donghui & Gebhardt, Henry. (2018). Gravitational Waves from Binary Mergers of Sub-solar Mass Dark Black Holes. Physical Review Letters. 120. 10.1103/PhysRevLett.120.241102.

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