

Gravitational wave astronomy has placed strong constraints on fundamental physics, and there is every expectation that future observations will continue to do so. In this talk, we quantify this expectation for future binary merger observations in light of constraints on hidden sectors, such as scalar-tensor gravity or dark matter, which induce a Yukawa-type modification to the gravitational potential. These constraints will be estimated through a Fisher analysis on a modified waveform computed in the restricted post-Newtonian approximation. We will show that when applied to a minimal model of dark matter, these constraints provide an exquisite probe of hidden dark matter accumulation in neutron stars.