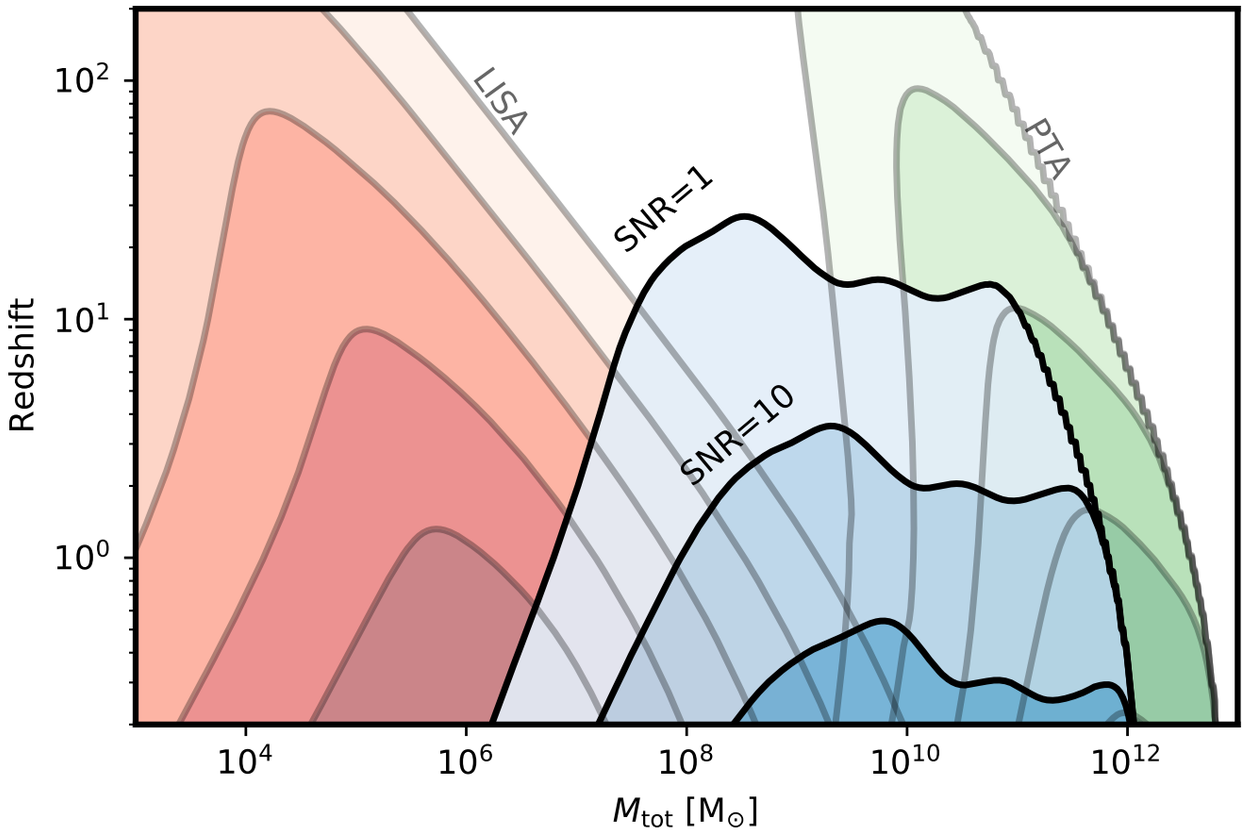
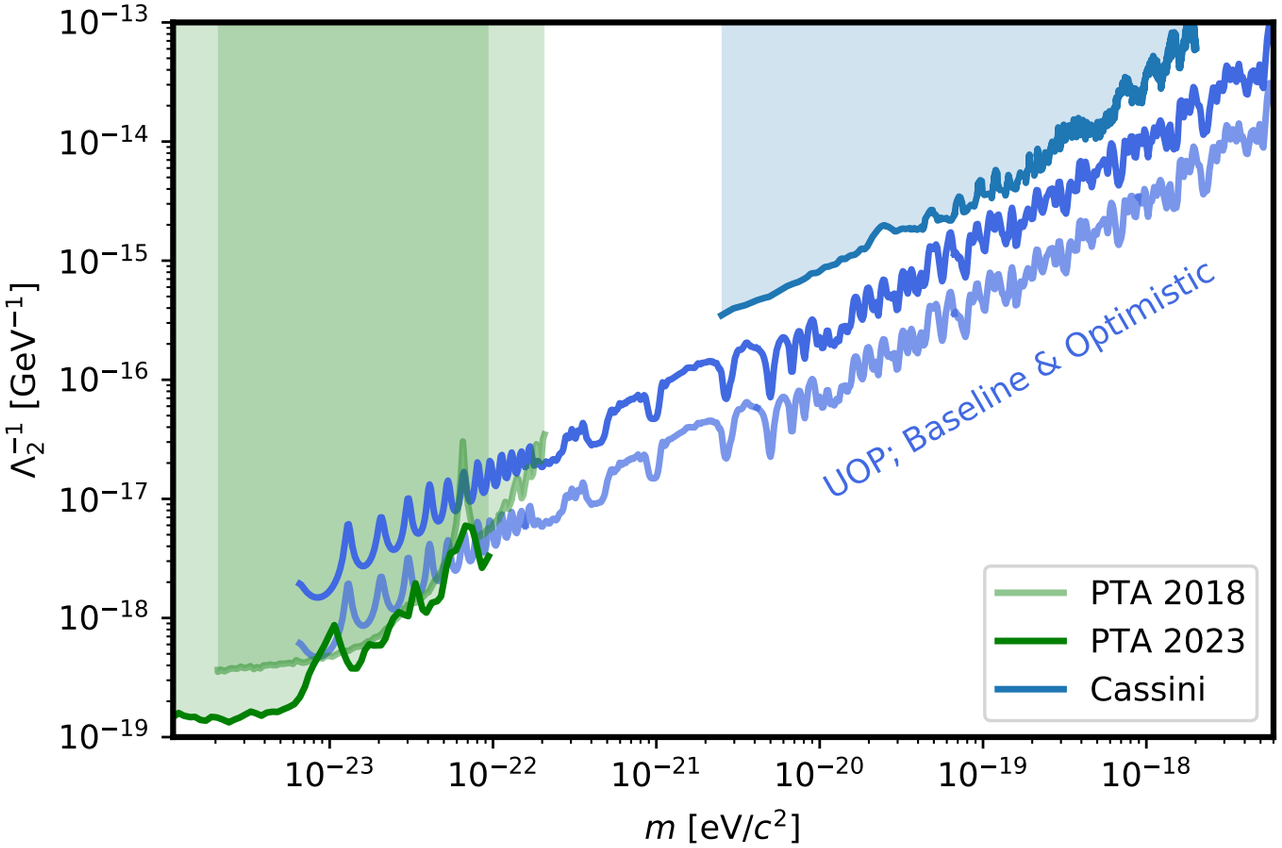
Gravitational Waves, Dark Matter, and Early-Universe Cosmology with the Uranus Orbiter Probe





Left: Contours of signal-to-noise for in-spiraling massive black hole binaries as detectable by LISA (left, red), The Uranus probe (middle, blue), and the Pulsar Timing Arrays (right, green). Tracking the Uranus orbiter probe could allow detection of massive black hole binaries in the gap between the two existing GW detector designs (LISA and PTAs).

Right: Sensitivity to coupling of Ultra-light Dark Matter to normal matter, in the space of coupling-constant (y axis) and dark matter mass (x axis). Green and blue shaded regions show constraints from Pulsar Timing Arrays and tracking of the Cassini probe. The space above the blue lines could be constrained by the Uranus Orbiter Probe.