The quantum geometric limit SETH LLOYD, MIT — This talk presents fundamental quantum limits to measuring space-time geometry. By applying the fundamental physical bounds to measurement accuracy to ensembles of clocks and signals moving in curved spacetime – e.g., the global positioning system – I derive the quantum geometric limit: the total number of ticks of clocks and clicks of detectors that can be contained in a four volume of spacetime of radius r and temporal extent t is less than or equal to $rt/\pi \ell_P t_P$, where ℓ_P, t_P are the Planck length and time.

Seth Lloyd
MIT