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**Quantum opportunities in gravitational wave detectors**

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Interferometric gravitational wave detectors are poised to launch a new era of gravitational wave astronomy and unprecedented tests of general relativity. These detectors also provide opportunities for studying quantum phenomena on unprecedented scales. The sensitivity of a new generation interferometric gravitational wave detectors, currently being constructed, is expected to be almost entirely limited by quantum mechanics. I will explore the quantum limit and describe experimental progress toward circumventing it. I will discuss injection of squeezed states to mitigate photon shot noise, and also mirror trapping and cooling experiments to maneuver the quantum limitation that arises from the fluctuating radiation pressure force that light exerts on the movable mirrors of the interferometer. These experiments will lay the foundations for higher sensitivity future detectors.