

Abstract Submitted
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Sensitive force detection with a single trapped ion probe RAVID SHANIV, ROEE OZERI, Weizmann Institute of Science, OZERI TEAM — Trapped ions can be used as sensitive force probes. The ion motion in the trap is highly sensitive to forces acting on it. Thus by measuring the shift in the ion position or velocity it is possible to estimate the force acting on the ion. We used a quantum lock-in detection scheme on a narrow optical quadrupole transition to detect a force which oscillates at much lower frequency than the ion's trapping frequency. Our quantum lock-in detection measures the phase that is accumulated by the periodic Doppler shift due to the ion's motion. We achieve force detection sensitivity of the order of $10^{-21}N$.

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