

Abstract Submitted  
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**High Dynamic-Range Atom Interferometry** DIMITRY YANKELEV,  
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of Science — Cold atom interferometers are among the most sensitive instruments  
for measuring inertial forces, such as gravity, gravity gradients, accelerations, and  
rotations. As a phase measuring instrument, the dynamic range of a single interfer-  
ometer is limited to  $2\pi$  radians, and a trade-off exists between dynamic range and  
sensitivity that is defined only by the experimental signal-to-noise ratio. We propose  
and experimentally realize techniques that overcome this limitation by performing  
interferometric measurements with multiple scale factors, which vary between ex-  
perimental cycles or within the same one. We demonstrate orders of magnitude gain  
in dynamic range with minimal loss of sensitivity.

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