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Towards Entangled Atom Interferometry KISHOR KAPALE, Western Illinois Univ — Atom interferometry is an indispensable tool for ultra-precise metrology of electric, magnetic, and gravitational fields. The resolution available in the standard atom interferometric schemes is dictated by the standard quantum limit and it scales as $1/\sqrt{N}$, where N is the total number of atoms passing through the interferometer. One can, in principle, increase this resolution by a factor of $\sqrt{N}$ if one is able to employ entangled atoms as opposed to uncorrelated atoms to achieve resolution that scales as $1/N$. It is, however, extremely difficult to obtain entangled states of atoms suitable for atom interferometry. In this presentation I intend to discuss the challenges and possible routes to developing entangled atom interferometry using tools of quantum optics that allow us precise control over atom-light interaction and possible applications of such schemes.

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