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Bridging Gravitational and Quantum Worlds Using Coherent Atom Arrays

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Relativistic gravitational and many non-gravitational effects are intrinsically weak in their coupling to quantum systems and, therefore, require suitable amplification. To this end, we have identified coherent collections of quantum systems, such as atom arrays, as novel coupling interfaces between relativistic, gravitational, and quantum physics. To illustrate their potential, we shall discuss two recently reported phenomena: (a) *Gravitational Wave-Induced Photon Superradiance in Atoms* and (b) *Time-resolved and Super-radiantly Amplified Unruh Effect*. References: (a) arXiv:2408.12436 (b) arXiv:2501.16219 Authors List:- Ref. (a): **Navdeep Arya**, Magdalena Zych Ref. (b): Akhil Deswal, **Navdeep Arya**, Kinjalk Lochan, Sandeep K. Goyal

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