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Portable Yb Optical Lattice Clock: Towards Precision Measurement Outside the Lab[1] WESLEY BRAND[2], ROBERT FASANO[3], RICHARD FOX, WILLIAM MCGREW[4], YOUSSEF HASSAN[5], XIAOGANG ZHANG, KYLE BELOY, DANIELE NICOLODI, ANDREW LUDLOW, NIST, Boulder — As optical atomic clocks continue to increase in precision, interest has grown in redefining the SI second based on an optical atomic transition. Before the second can be redefined, a wide range of optical clock comparisons must be made to rigorously test the realizable performance. Due to challenges in long-distance optical time and frequency transfer, these comparisons often require physically moving one optical clock near another. However, constructing a robust portable system is challenging for this complex experimental apparatus. Here, we report on experiments and design efforts for developing portable Yb optical lattice clocks with systematic uncertainty $< 10^{-17}$ employing automatic systems for optical alignment and locking, despite a compact package of 1.5 m^3. Additionally, we provide a brief update on recent developments and improvements on laboratory-based Yb optical lattice clocks at NIST.

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