

Ultra-high precision time measurement technologies leading to a new time-business

Space-time information platform with a cloud of optical lattice clocks

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Summary :

The optical lattice clock, taken as a ridiculous idea in 2001, has come true and changed the game for building highly precise and stable atomic clocks. In this project, we will develop a space-time information platform by networking “optical lattice clocks”, which improve the uncertainty of atomic clocks used in GNSS (Global Navigation Satellite System) by three orders of magnitude. Such a platform will benefit future high-capacity network systems, navigation, and other services.

Since the dawn of history, mankind has elaborated technologies for timekeeping and developed applications to fully use time resources. These technologies have triggered a paradigm-shift in communication and information technologies. In order to facilitate a new breakthrough in industrial and academic fields introduced by highly-precise clocks, we will develop transportable and compact “optical lattice clocks” that allow remote maintenance and unattended operation. By networking them via phase-stabilized fibers, we will demonstrate clocks’ application to relativistic geodesy and establish a space-time information platform that will substitute GNSS.

