Taking the Leap: Moving to Continuous UTC

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Abstract

The irregular rotation speed of the Earth causes constant challenges in timekeeping. The imprecise observe solar time (UT1) routinely drifts away from the precise International Atomic Time (TAI), the latter of which is the foundation of the widely used international timekeeping standard Coordinated Universal Time (UTC). As a result, the leap second was introduced in 1972 to keep the UTC and UT1 systems within 0.9 seconds of each other at all times. This process has since become a regular occurrence, as it has been applied 27 times in the last 50 years. On November 18, 2022, the General Conference on Weights and Measures (CGPM) passed a resolution recommending the move to timekeeping on continuous UTC no later than the year 2035. Once put into effect, UTC and UT1 would diverge, as UTC would instead mirror Terrestrial Time (TT) by a constant time offset that would include a large initial offset to help UTC remain continuous for at least a long period. This change in timekeeping has wide-reaching implications on the astronomical community, and this presentation will focus on some of the practical effects of this redefinition. This discussion will include emerging challenges and potential solutions, including those present in astronomical observation and almanac data.

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