



Test of general relativity theory by directly comparing the time elapses of two atomic hydrogen clocks

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According to Einstein's general relativity theory (GRT), a precise (atomic) clock runs quicker at a position with higher gravitational potential than a clock at a position with lower potential. Due to quick development of time-frequency science, the GRT principle could have potential applications in geodesy. Until now, there are not sufficient experiments of directly comparing the time elapse of two clocks separated by a height. Here we provide direct clock comparison using a fixed hydrogen clock and a portable hydrogen clock. Without stopping their running, after comparing the time elapse of two hydrogen clocks at the positions at the same height level, they were compared by a separation of a height difference of about 22 meters for a period. Experiments are still in process and relevant results will be presented. This study is supported by National 973 Project China (grant No. 2013CB733301 and 2013CB733305) and NSFCs (grant Nos. 41174011, 41429401, 41210006, 41128003, 41021061).