

New methods for measuring gravitational constant

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Abstract. The measurements of time and frequency are very accurate with modern technology. Using them we can measure the gravitational constant very accurately. First we derive from the higher dimension a formula for the gravity-induced phase shift around a circuit loop, which amounts to an order of 10^{-6} . We propose experiments to detect this phase shift by using the high- T_c d-wave Josephson junction which is included in a cuprate superconductor circuit loop. By rotating the loop round the horizontal axis, the gravity-induced phase shift can be detected as a frequency shift which can be measured very accurately. And then we can determine the gravitational constant. This method will be sensitive and accurate. In addition, we propose another method. We use a setup similar to the synchrotron radiator, which can produce a pulse radiation (in a short strong magnetic field) covering the Josephson junction made of the high- T_c superconductor. The phase shift produced by the gravity can be detected as a frequency shift. In this paper we will describe and discuss these new methods in detail.

Keywords: gravitational constant, high- T_c Josephson junctions, phase shift

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REFERENCES

1. He Jian-E, (2007) *Front. Phys. China*, **2(2)** 208.