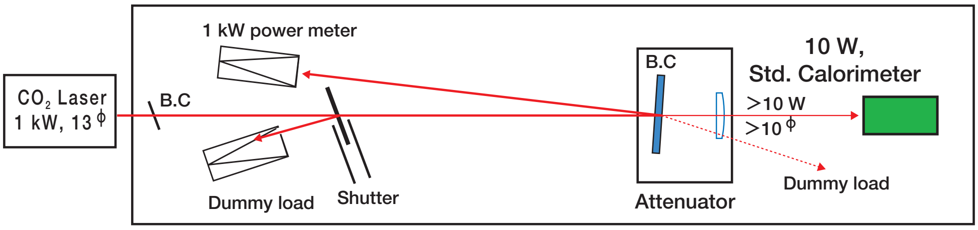
Development of Precision Power Measurement System for High Output Lasers

Michiyuki ENDO
Metrology Institute of Japan
e-mail:m.endo@aist.go.jp
AIST Today Vol. 4, No.1 (2004) 17

A new method of precision power measurement to 1 kW lasers, where a high-reflection coated beam splitter is used as a high-power optical attenuator, and this attenuator is combined with an isothermal calorimeter. The calorimeter is a double-configuration consisting of an absorbing unit using a disk absorber having a short time constant and a Peltier cooling unit which are operated simultaneously. The principle of the measurement is based on the dc substitution method. The ratio of the substituted laser power to the dc power is determined for the absorbing unit. The design of basic construction is described.

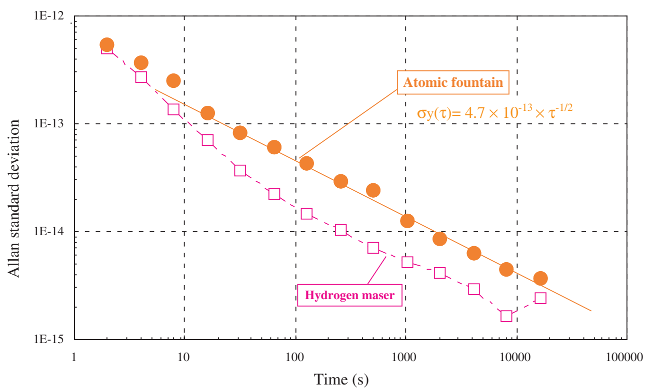


A typical arrangement for 1 kW-level laser power

Development of an Atomic Fountain Time/Frequency Standard

Takayuki KUROSU
Metrology Institute of Japan
e-mail:
t.kurosu@aist.go.jp
AIST Today Vol. 4, No.2 (2004) 11

The motion of atom is the main factor that limits the precision of the time/frequency standard. AIST has developed a cesium atomic fountain frequency standard, in which the motion of atom is frozen to below 1 μK by laser cooling. Due to the low temperature, the linewidth of Ramsey fringes, to which the microwave frequency is stabilized, is reduced to 0.8 Hz. The evaluation of the new frequency standard is in progress, and a frequency stability of $\sigma(\tau) = 4.7 \times 10^{-13} \times \tau^{-1/2}$ is obtained (Fig. 1).



Frequency stability of an atomic fountain frequency standard