Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

**Measurement of the lifetime of an gold isotope** KAZUHIRO KURIHARA — The lifetime of unstable isotopes is one of the most important observables in nuclear physics, because it corresponds to the decay constant, from which we can investigate wave functions of the initial and final states. This measurement was carried out to experimentally demonstrate the exponential decay law and to understand the concept of lifetime. First of all, a sheet of gold sample was irradiated by neutrons which were generated by stopping protons of 12 MeV in Tohoku University cyclotron RI center facility. Then $\gamma$ ray emitted from the sample were repeatedly measured by a NaI scintillation counter for 8 days, each measurement lasting for 400 seconds. A peak was observed at about 410 keV in the NaI pulse height spectrum. It was consistent with the 411.8 keV energy for the $\gamma$ ray ejected from the $^{198}$Hg, the daughter nucleus of $^{198}$Au after $\beta$ decay. The observed count of the 411 keV $\gamma$ ray was gradually decreased as time passed. The decreasing counts were fitted well by an exponential decay curve and the lifetime $\tau$ was determined to be 3.92 days. It is consistent with the lifetime of $^{198}$Au. Therefore the unstable nucleus was identified $^{198}$Au.

Kazuhiro Kurihara

Date submitted: 26 Jul 2005 Electronic form version 1.4