

# CLEAR(時間反転対称性の破れ)

7/7/2006

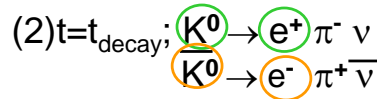
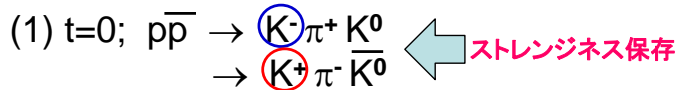
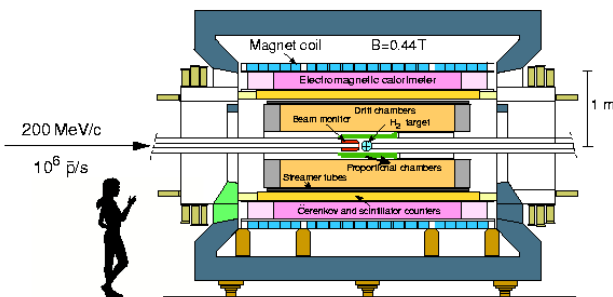


**CP:** C(Charge:電荷)P(parity:パリティ)対称性  
**LEAR:** Low Energy Antiproton Ring

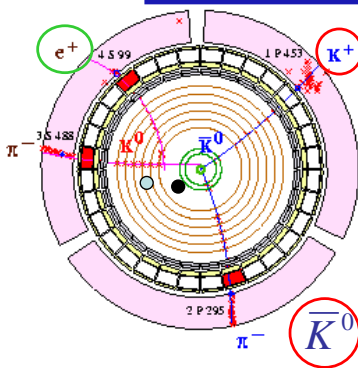
- Parity P  $\vec{x} \rightarrow -\vec{x}$
- Time reversal T  $t \rightarrow -t$
- Charge conjugation C  $q \rightarrow -q$

$$A_T = \frac{R[\bar{K}^0(t=0) \rightarrow K^0(t=\tau)] - R[K^0(t=0) \rightarrow \bar{K}^0(t=\tau)]}{R[\bar{K}^0(t=0) \rightarrow K^0(t=\tau)] + R[K^0(t=0) \rightarrow \bar{K}^0(t=\tau)]}$$

## The CPLEAR Detector



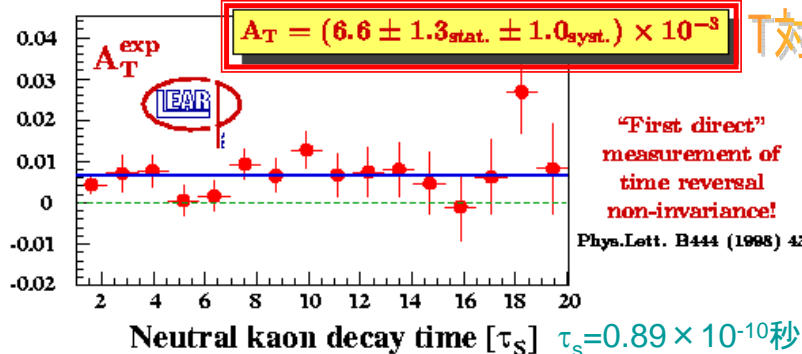
## Analysis of $K^0 \rightarrow \pi^\mp e^\pm \nu$



electron identification:

- $dE/dx$  in the scintillators,
- number of photo-electrons in the Čerenkov,
- number of hits in the calorimeter

$$A_T = \frac{R(\bar{K}^0 \rightarrow e^+ \pi^- \nu) - R(K^0 \rightarrow e^- \pi^+ \bar{\nu})}{R(\bar{K}^0 \rightarrow e^+ \pi^- \nu) + R(K^0 \rightarrow e^- \pi^+ \bar{\nu})}$$



CPT 保存の下で、Tの破れとCPの破れは同じ。  
 CPの破れ⇒小林・益川理論 (3世代クォーク)