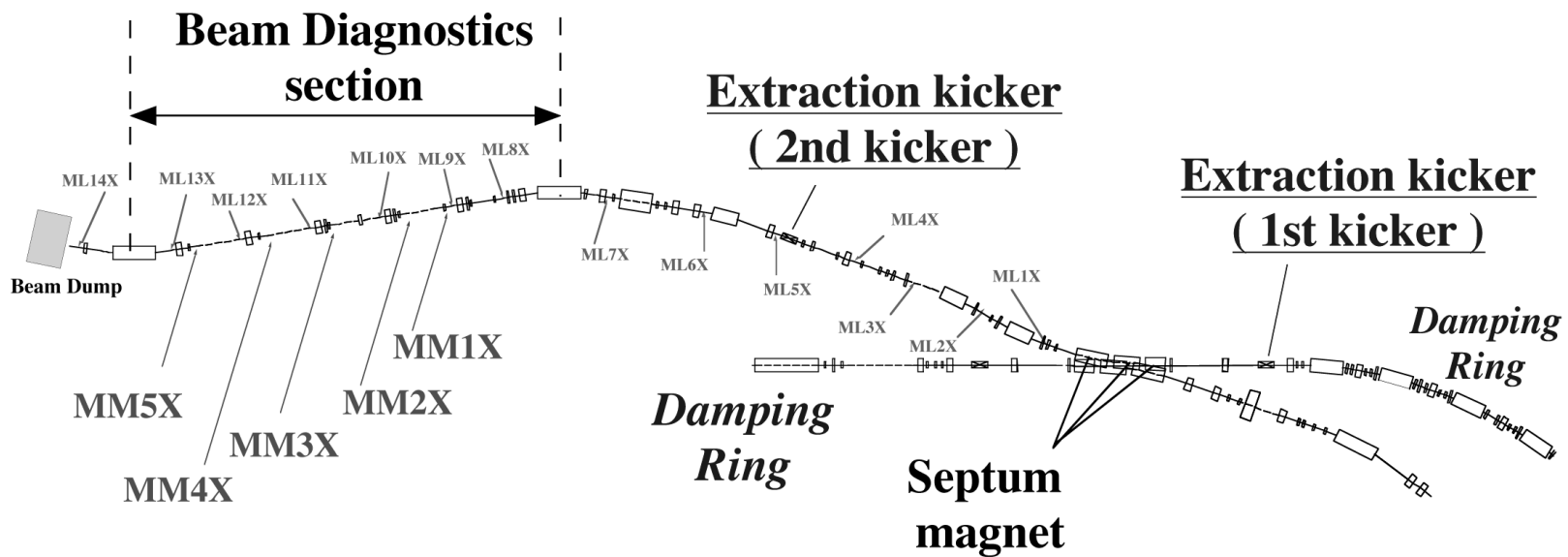


# Layout of KEK-ATF Extraction Line



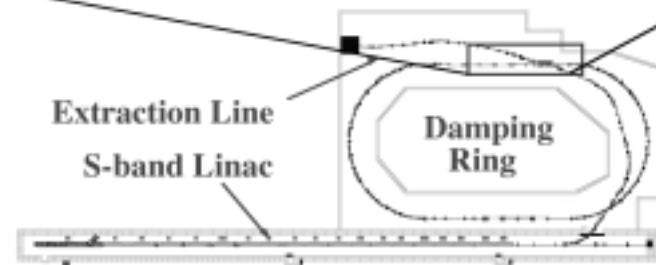
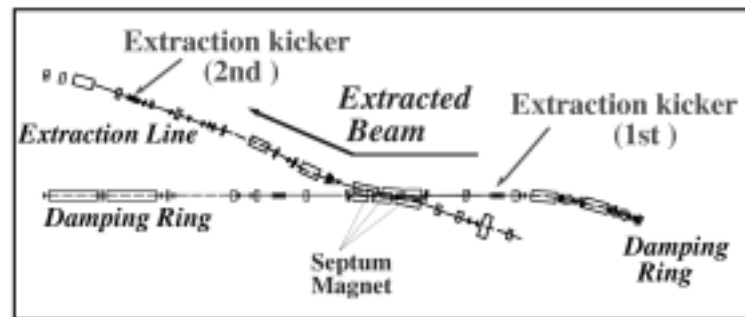
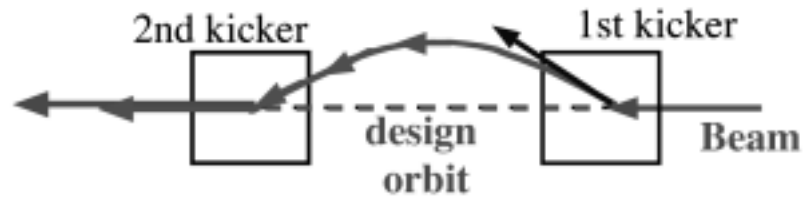
**Cavity BPM (MM1X-MM5X)**  
sensor cavity

# Double Kicker System

stable beam extraction from Damping Ring  
with two kicker magnets

*J.Urakawa et al. 'The Damping Ring of Accelerator Test Facility for Linear Collider' HEACC '92*

compensate kick angle jitter of 1st kicker  
by 2nd kicker



**requirement for injection to Main Linac**

**Stability** bunch by bunch / pulse to pulse

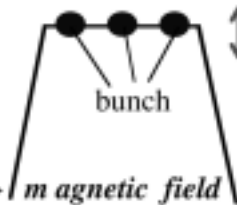
**\*jitter tolerance of the extraction kicker**

$$5 \times 10^{-4}$$

**<extraction with one kicker magnet>**

uniformity of pulse magnetic field

stability of power supply



**<extraction with two kicker magnet>**

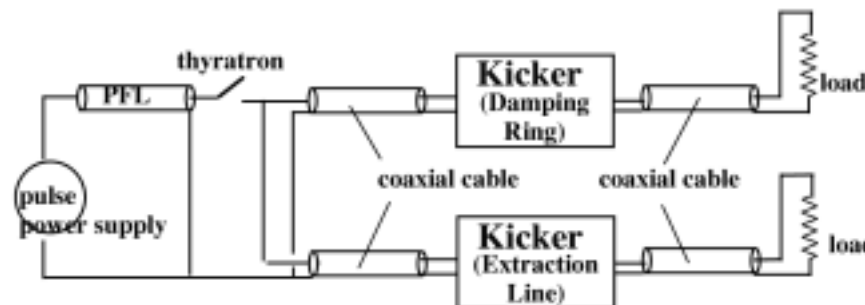
One power supply sends pulse into  
two identical kicker



Only the similarity  
is required

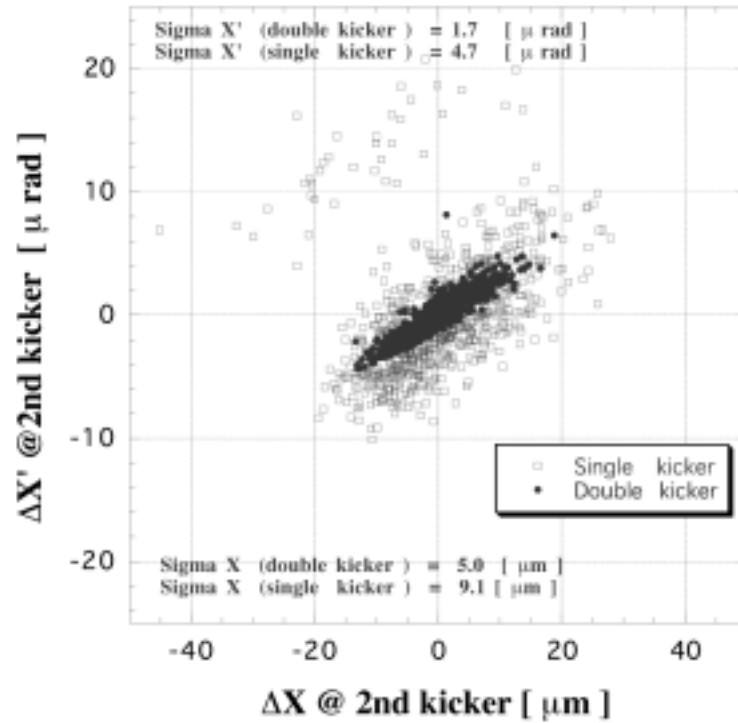
**( tight flatness requirement is not necessary ! )**

→ The difference can be compensated by  
tuning optics between two kickers



# Preliminary Result

**( $\Delta X, \Delta X'$ ) @ 2nd kicker  
measured by 5 cavity BPMs**



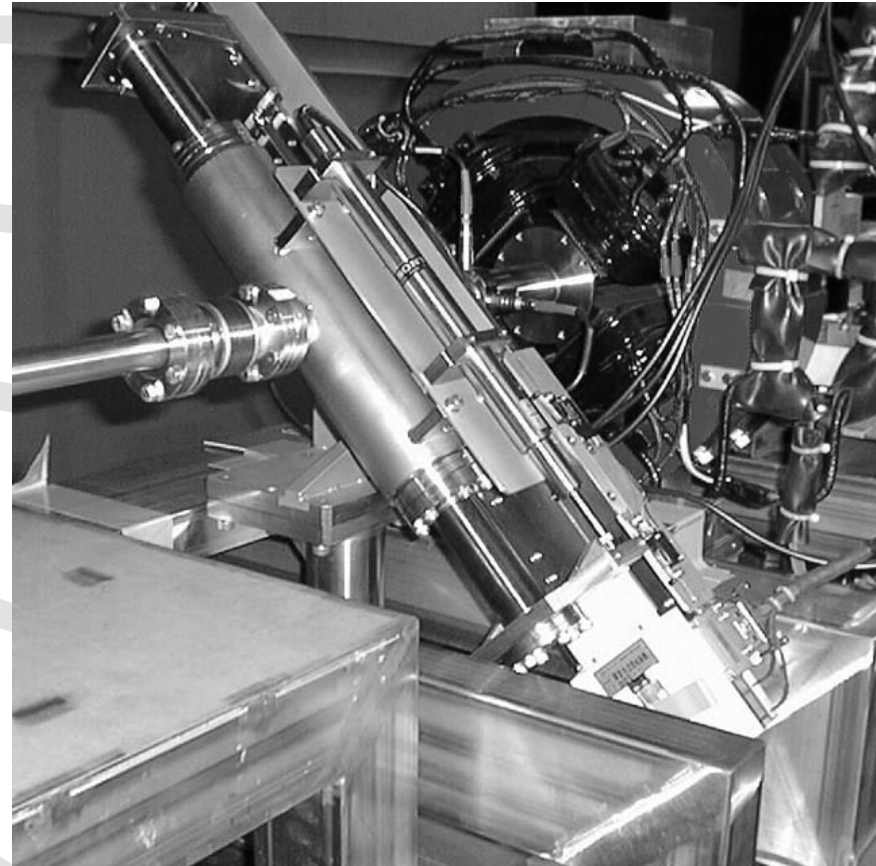
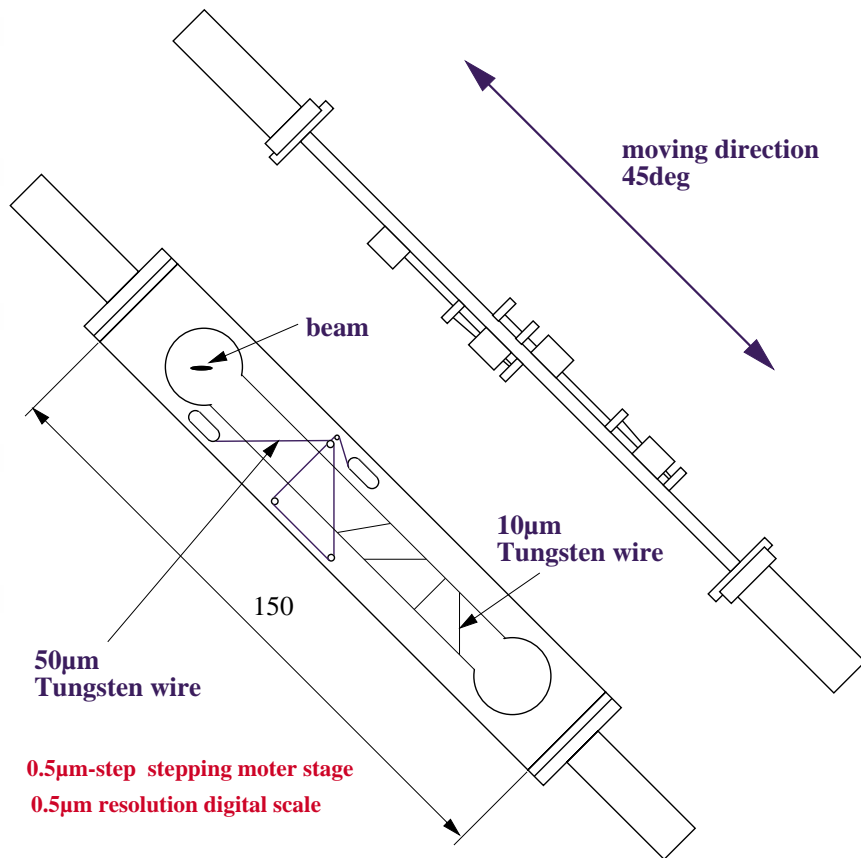
$$\sigma_{\Delta X'} = 4.7 \mu \text{ rad [single kicker mode]}$$



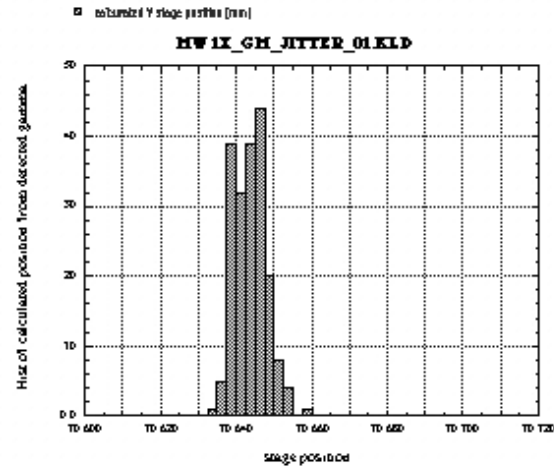
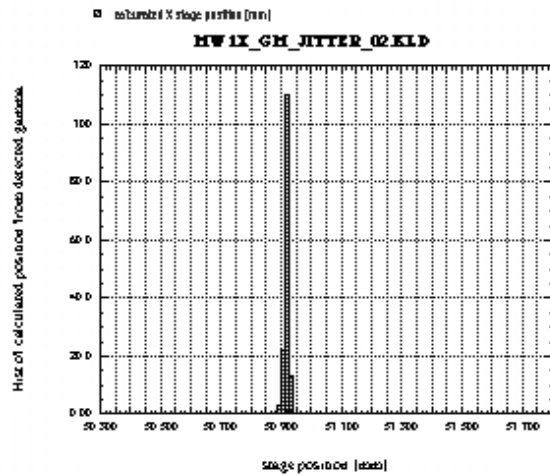
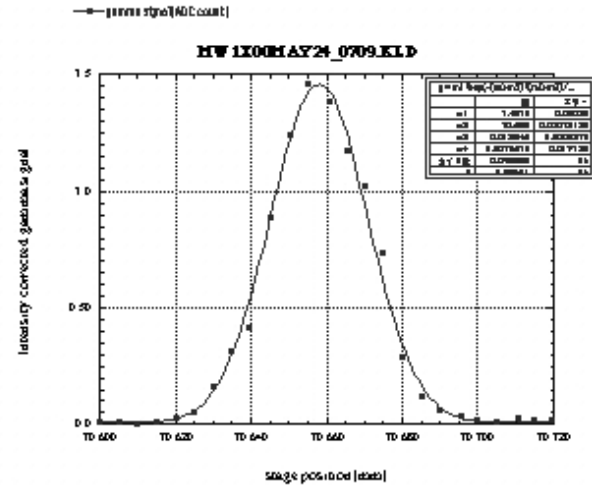
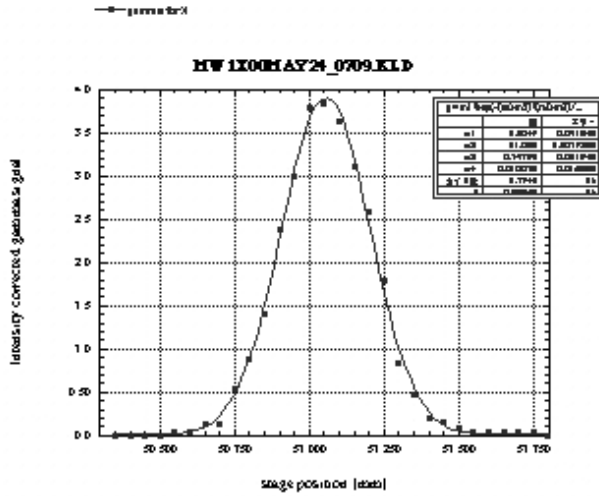
$$\sigma_{\Delta X'} = 1.7 \mu \text{ rad [double kicker mode]}$$

**stability  $3.4 \times 10^{-4}$**

# Tungsten Wire Scanner



# Beam position jitter by tungsten wire scanner

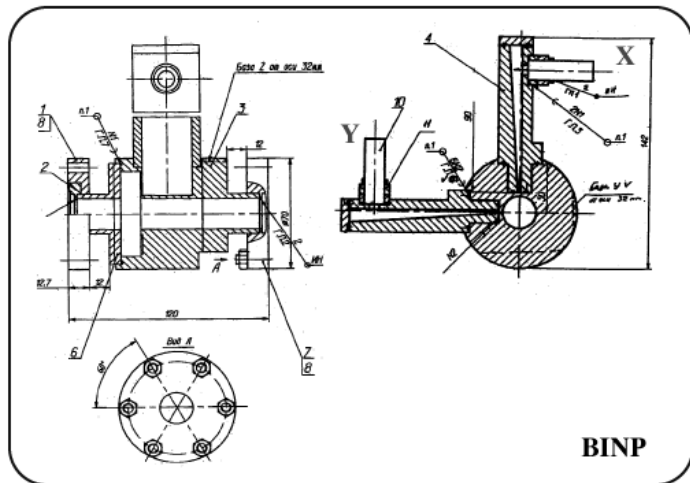


$X \text{ jitter} = 4.4 \mu\text{m}$

$Y \text{ jitter} = 2.4 \mu\text{m}$

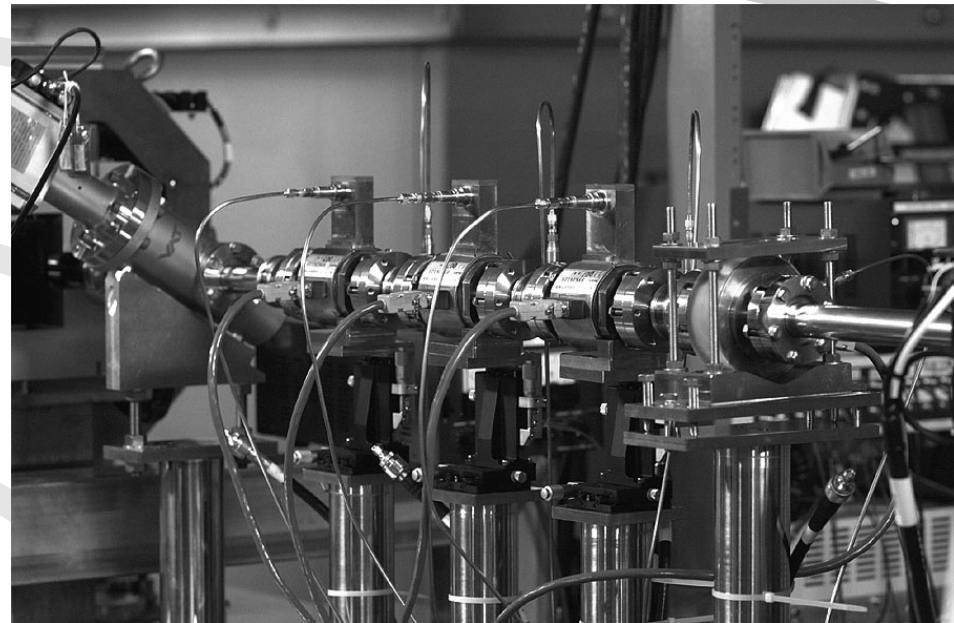
at MWIX

*Cavity BPM  
Senser Cavity*

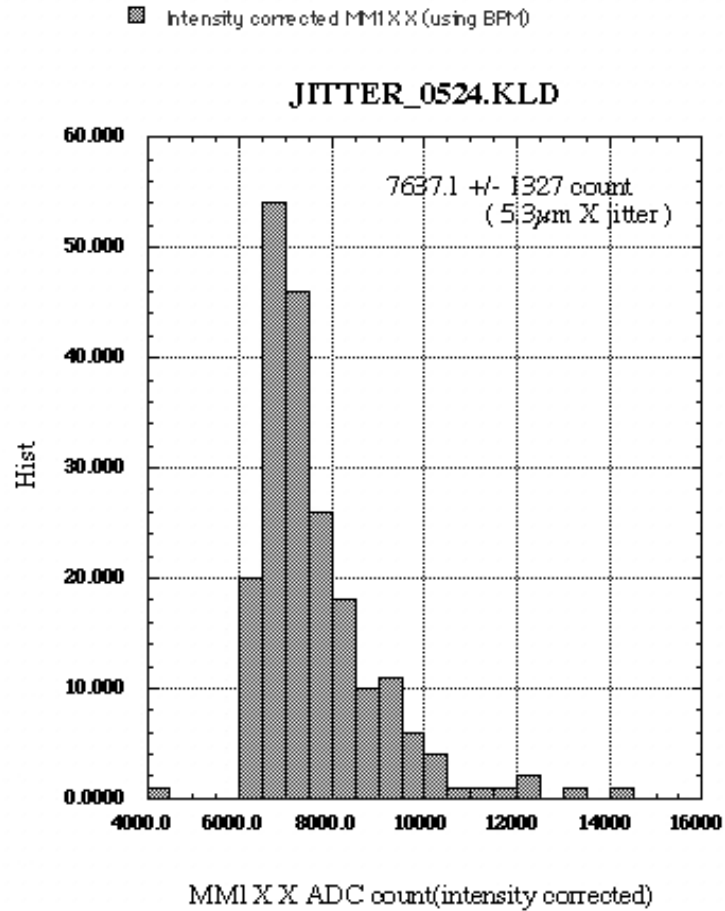


$f = 6.426\text{GHz}$   
*TM110 mode*  
 $QL \sim 8500$   
 $L = 120\text{ mm}$   
*beam pipe = 20 mm diameter*  
*single port (no CM rejection)*

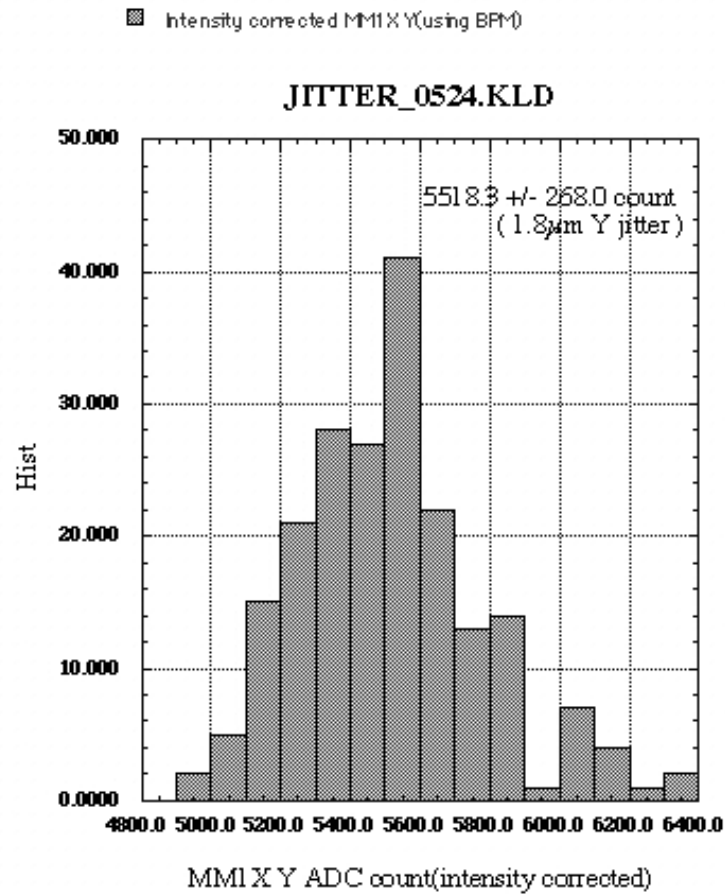
*Cavity BPM at Extraction Line*



# Beam position jitter by Cavity BPM



*X jitter 5.3 $\mu$ m*



*Y jitter 1.8 $\mu$ m*

*at MM1X*