

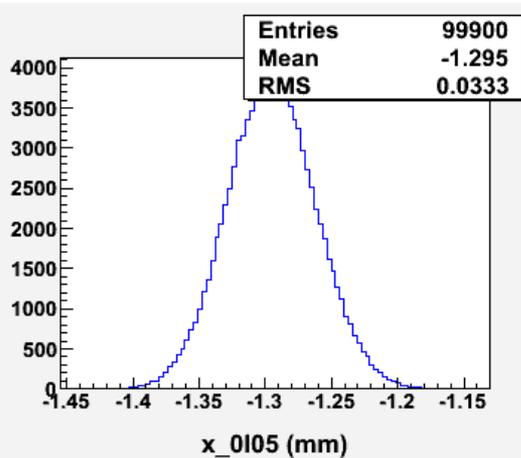
Beam Position Noise  
from 500 keV MBO0106  
Dipole Sensor

*May 13, 2009*

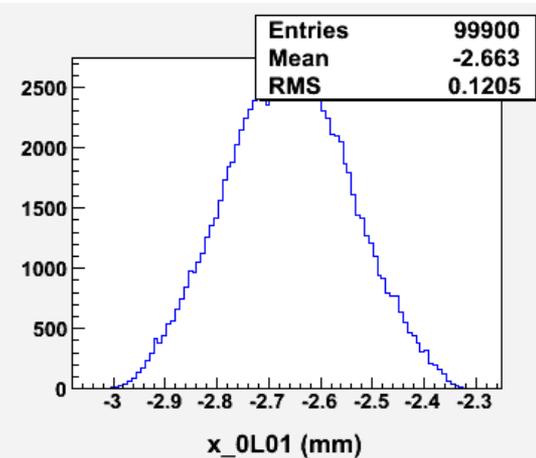
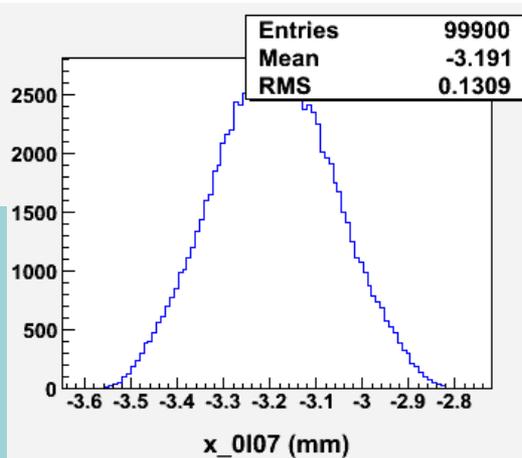
# *Beam Position Noise*

- The Sensor was installed as part of the Segmented Injector PSS system in early Summer 2006
- 500 keV Dipole Current Sensor moves beam at frequency other than 60 Hz; about 80 Hz
- This is the major source of beam position noise in Injector. 60 Hz line noise sources have been reduced
- This noise makes measuring helicity correlated position differences far less accurate; increases the width of position differences. Same for charge asymmetry if there is scrapping in the accelerator
- How does it affect the physics program?
  1. 30 Hz Helicity Reversal is designed to cancel 60 Hz line noise; Sensor noise will not cancel completely
  2. 240 Hz Helicity Reversal for PREx; most sensitive
  3. Qweak at 1 kHz is also sensitive but less than 240 Hz Helicity Reversal
- Fine for HAPPEX III and PVDIS. Fix by March 1<sup>st</sup> , 2010

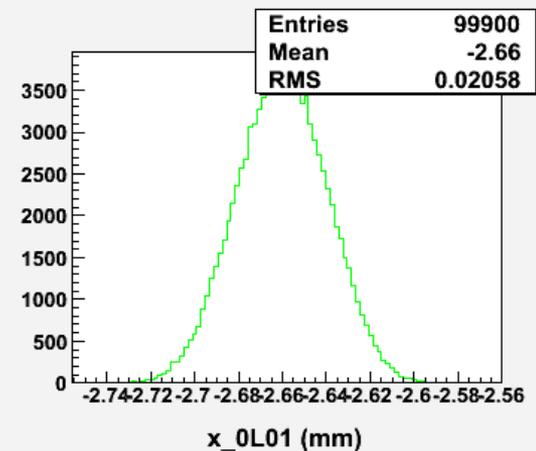
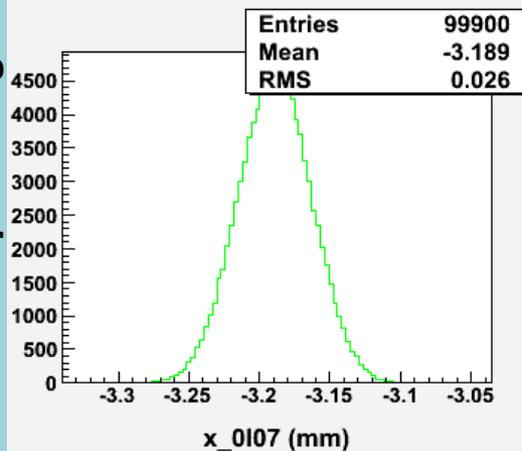
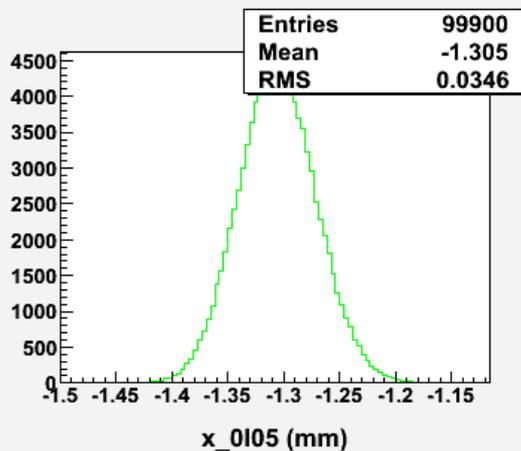
Sensor  
ON



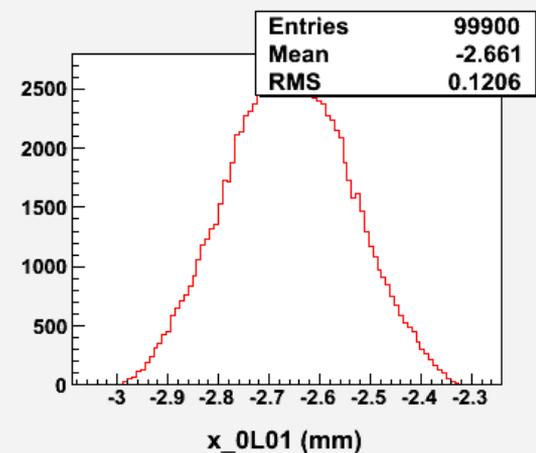
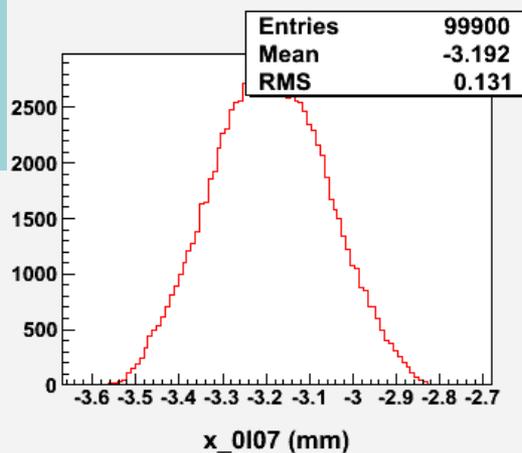
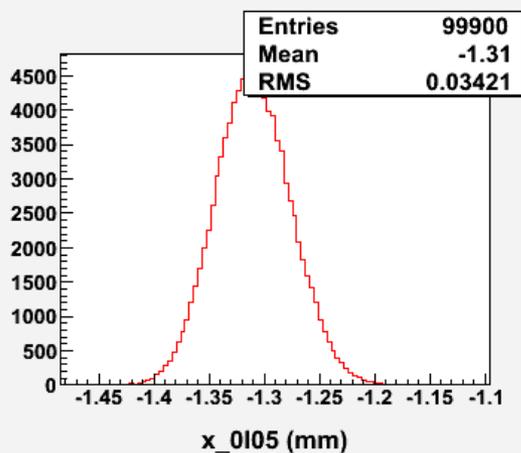
PSS Dipole Magnet



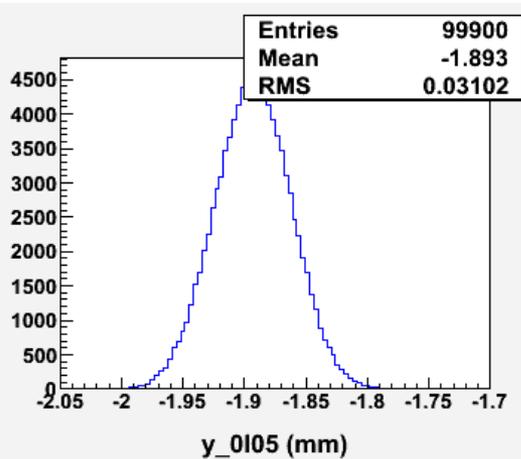
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OFF



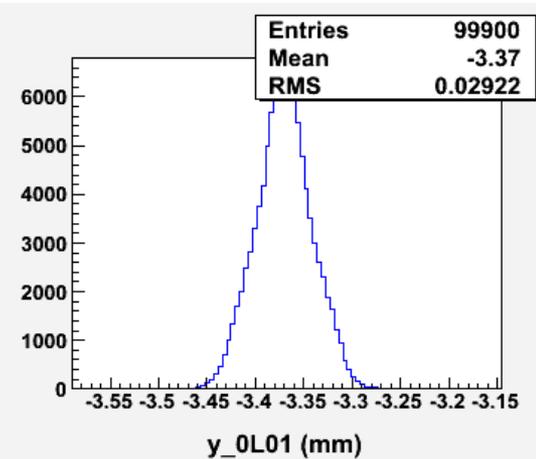
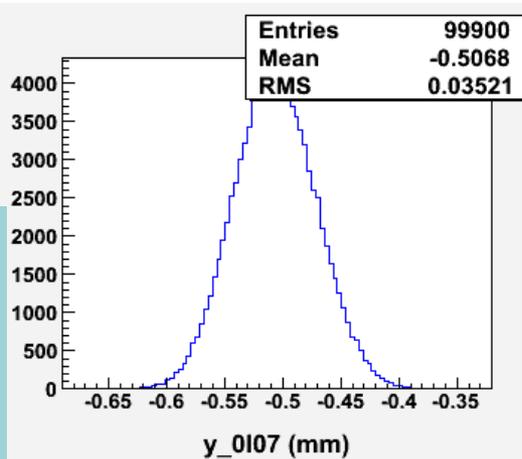
Sensor  
ON



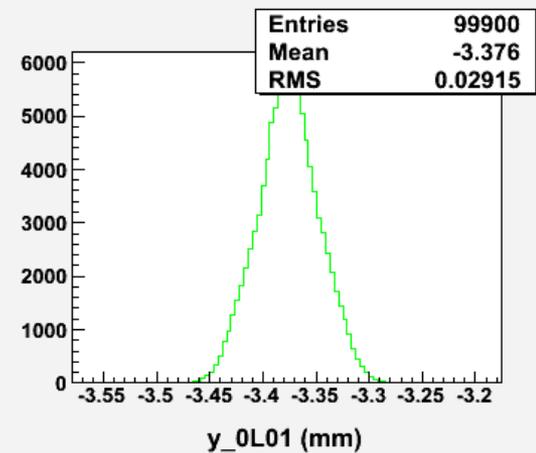
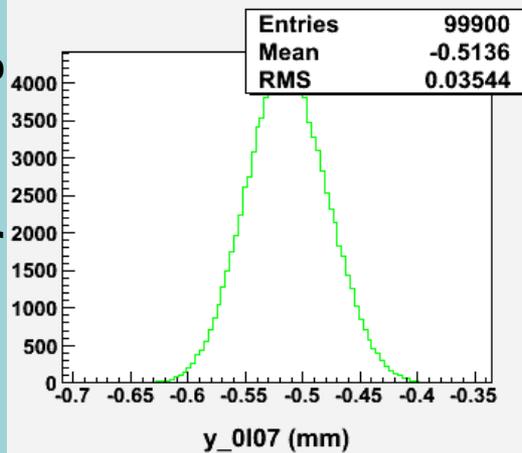
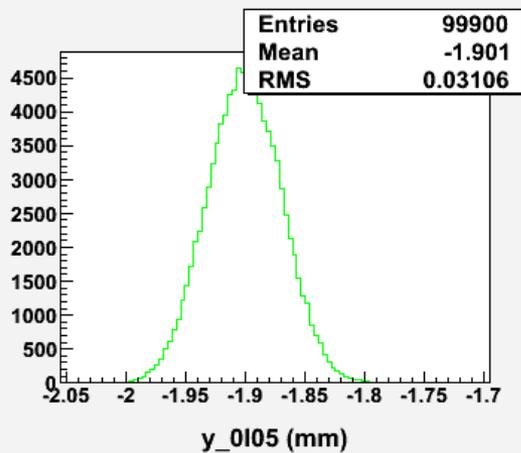
Sensor  
ON



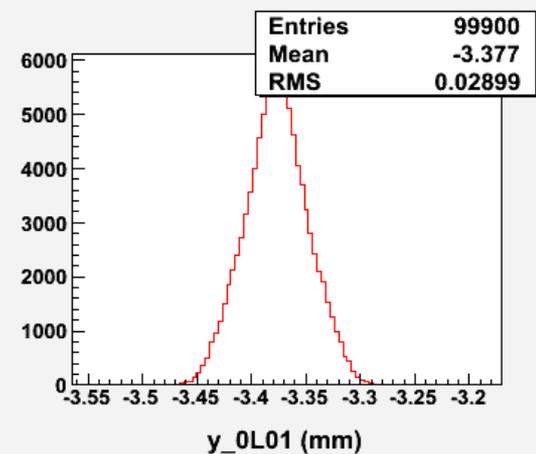
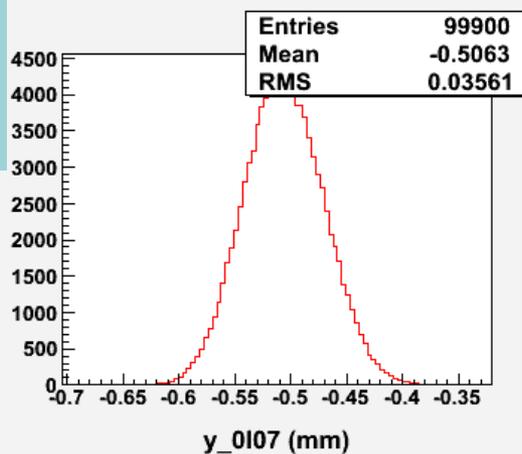
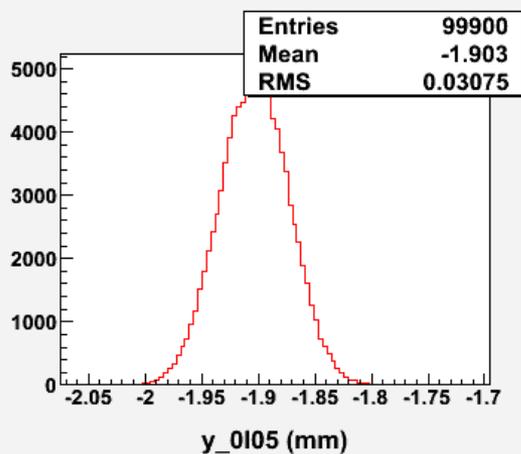
PSS Dipole Magnet



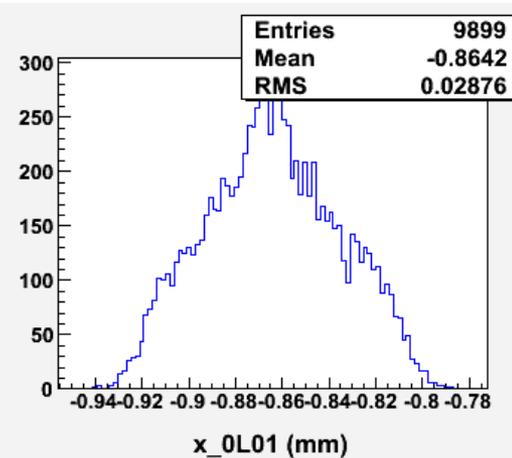
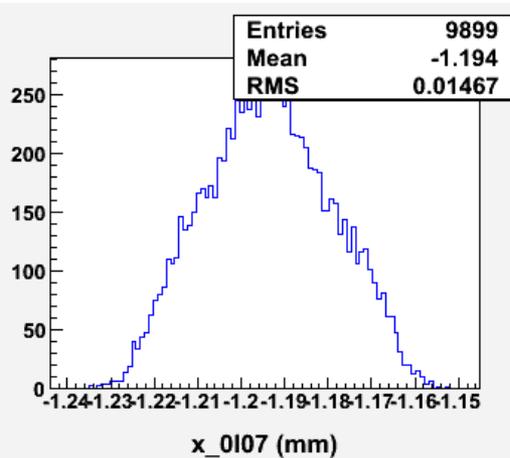
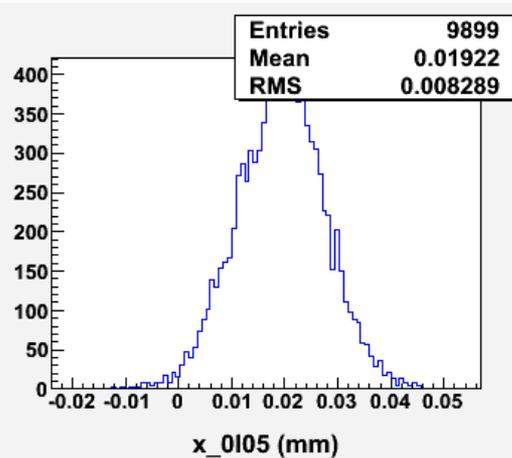
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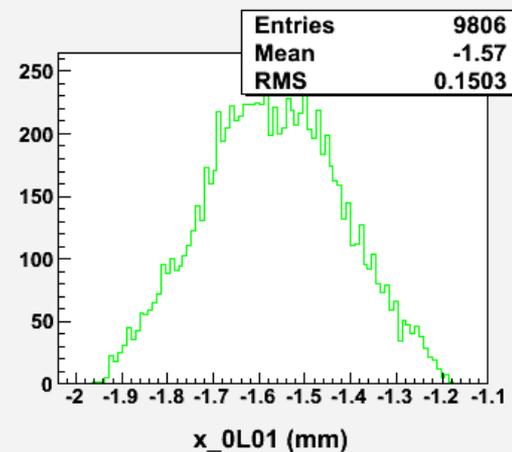
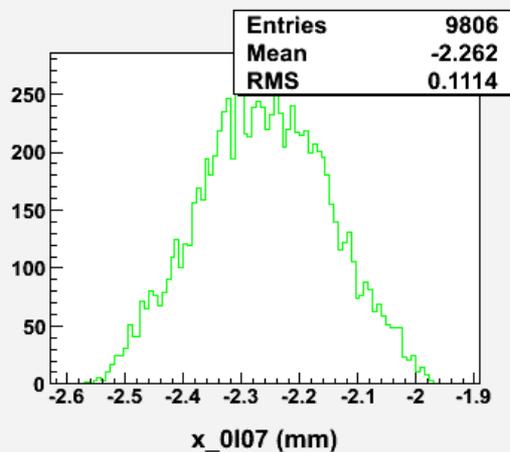
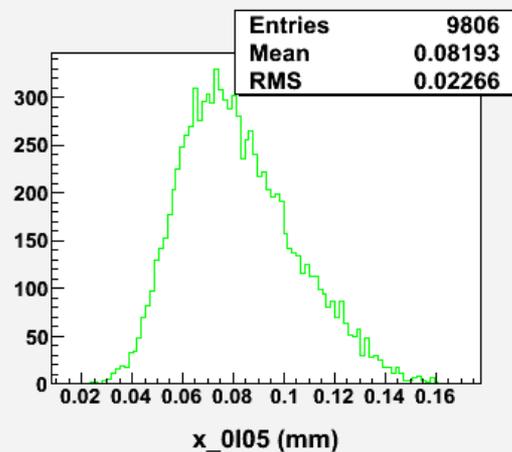
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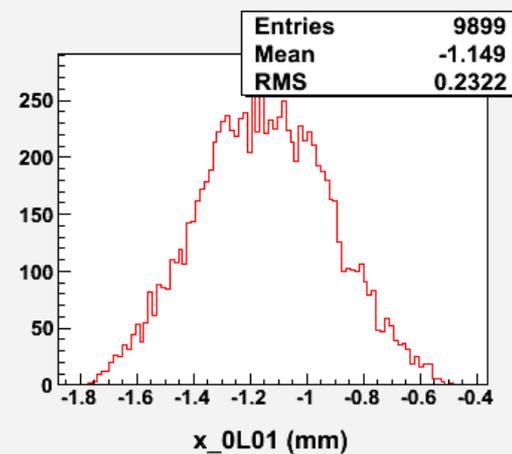
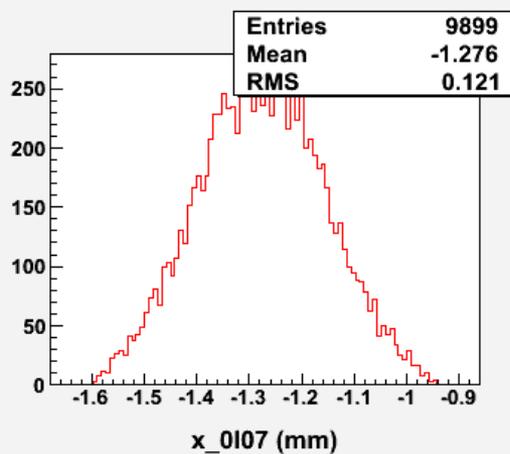
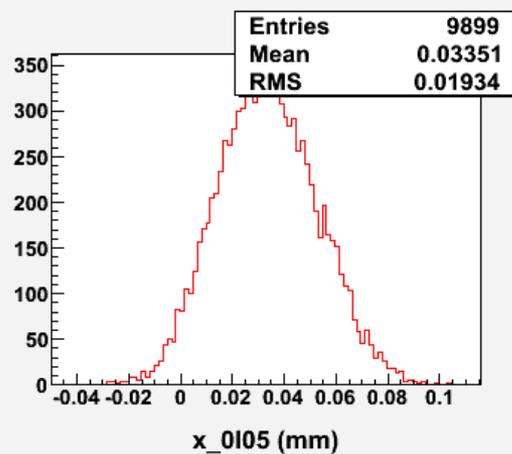
30 Hz



250 Hz

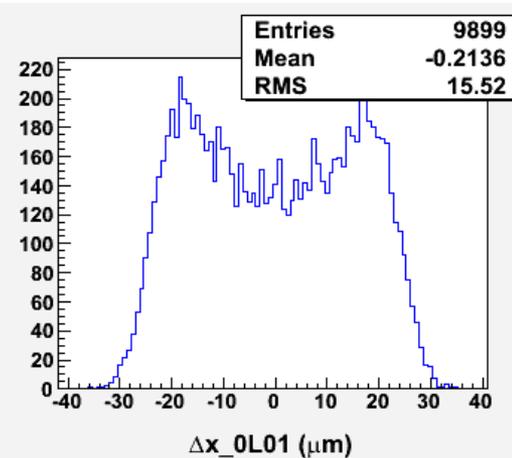
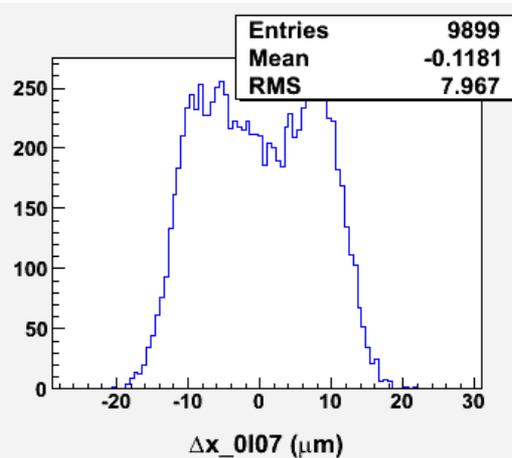
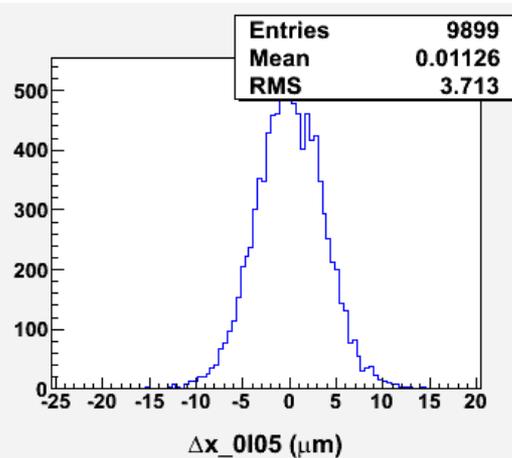


1 kHz

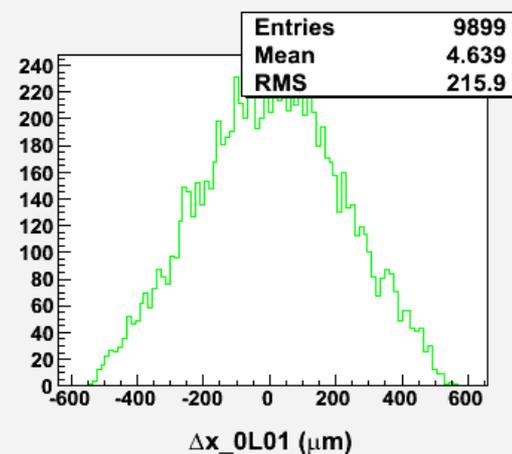
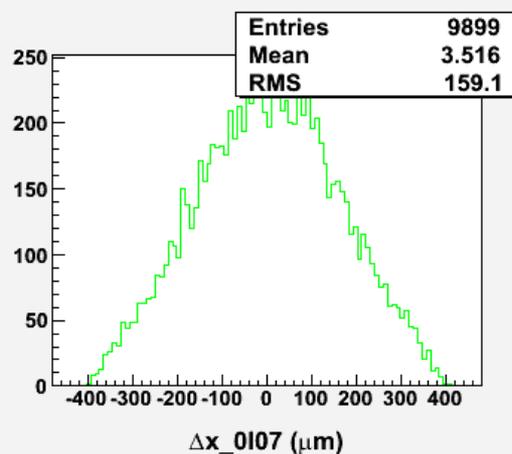
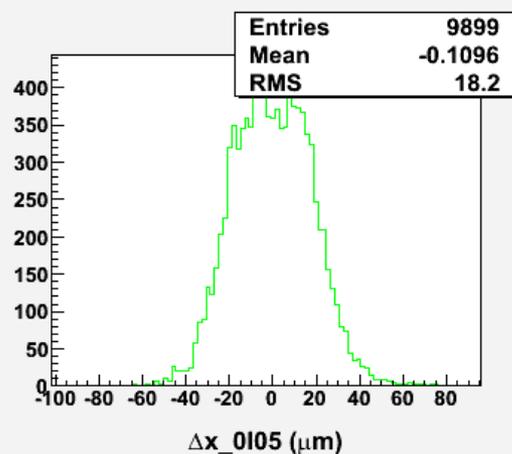


PSS Dipole Magnet

30 Hz

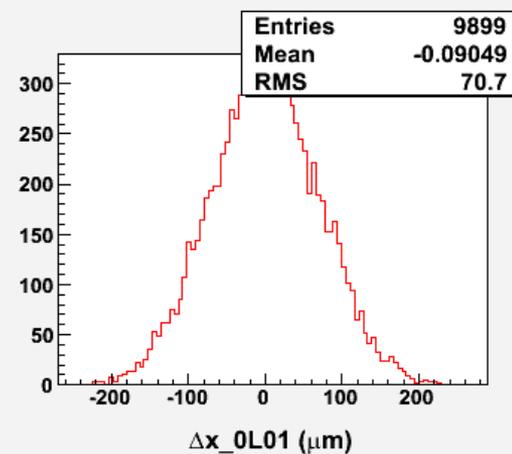
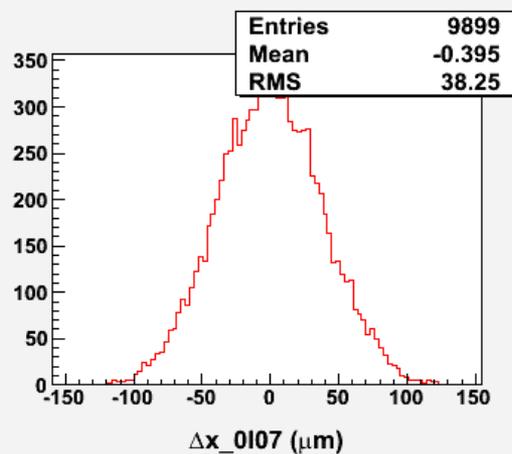
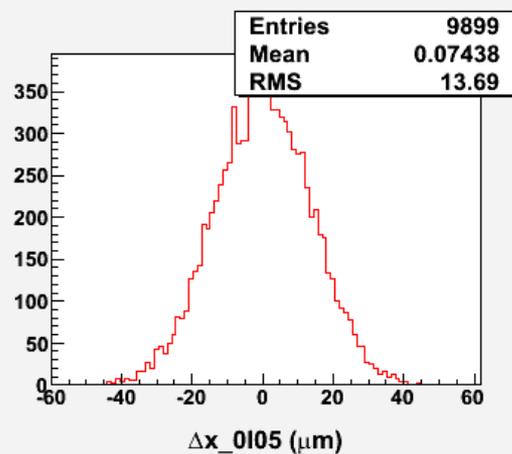


250 Hz

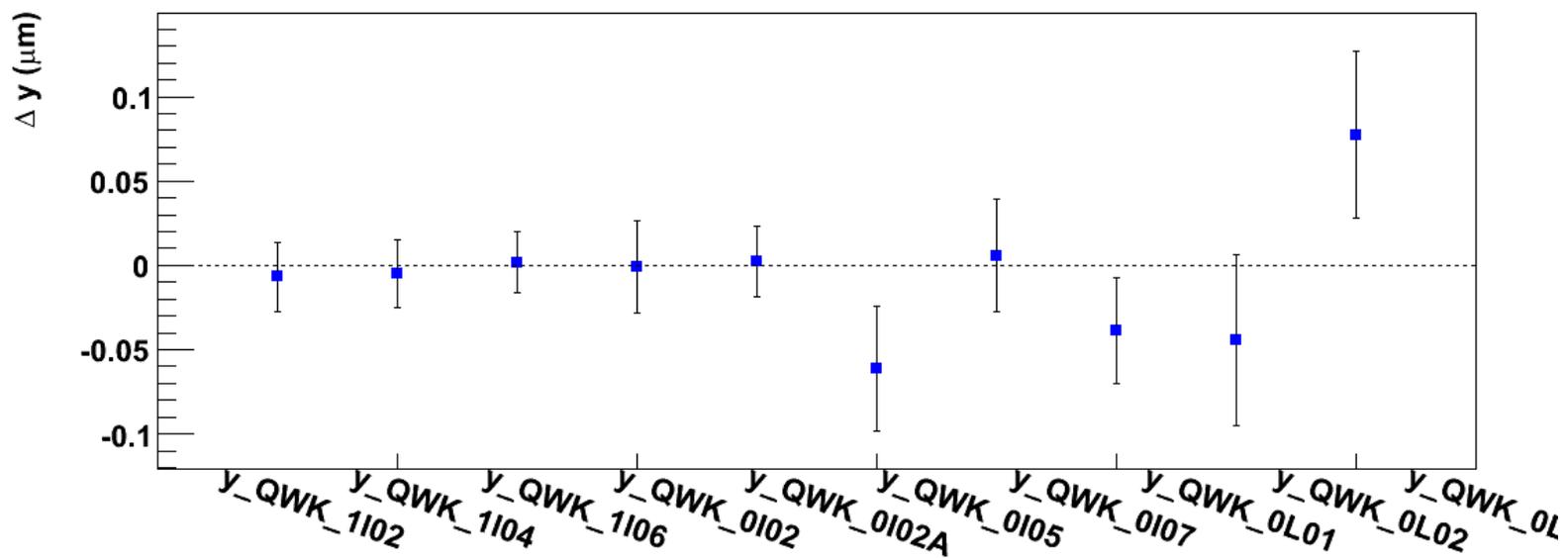
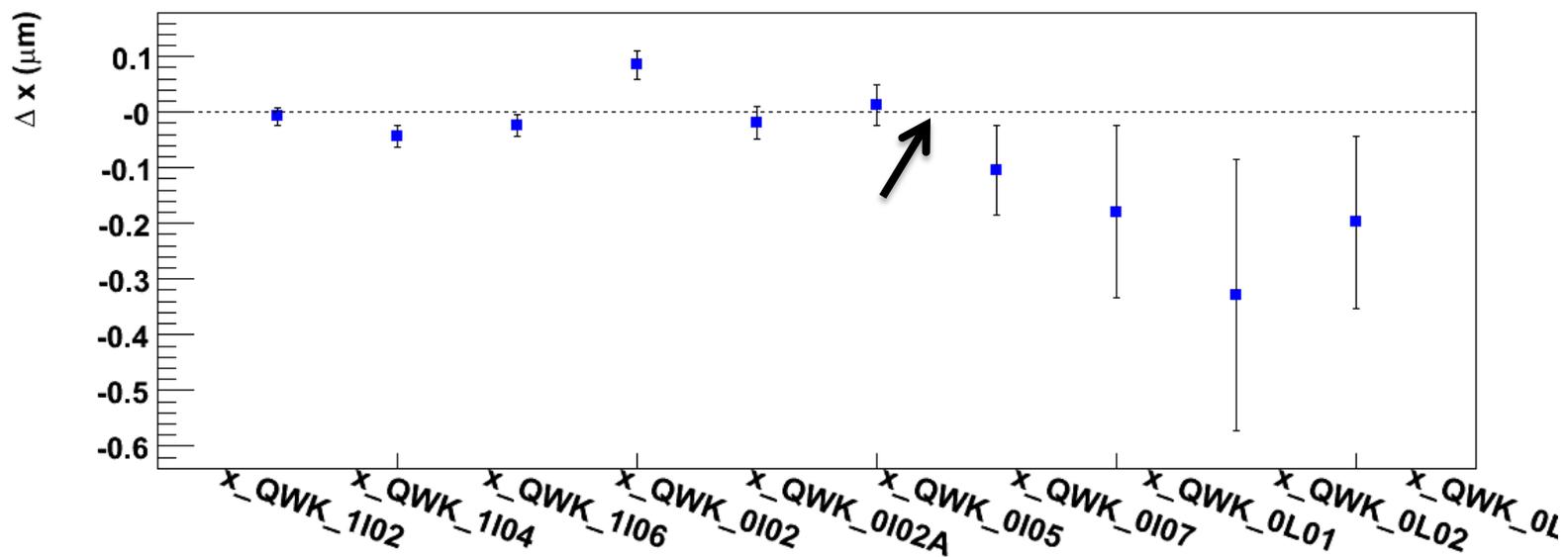


PSS Dipole Magnet

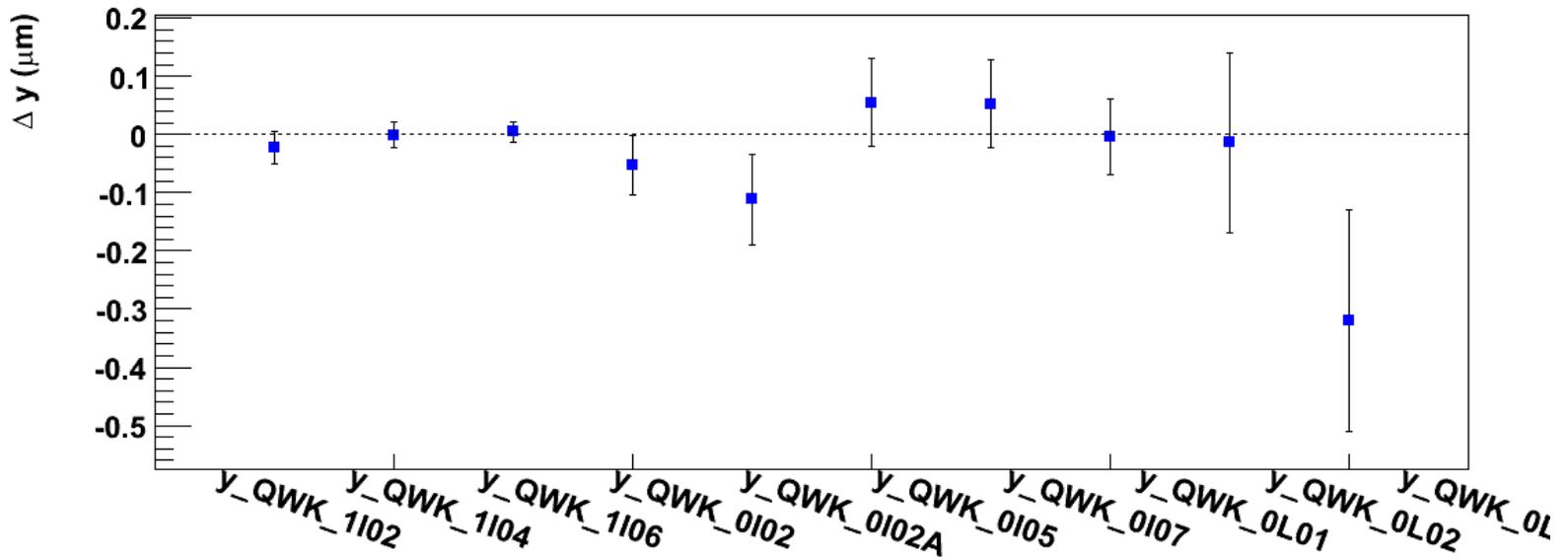
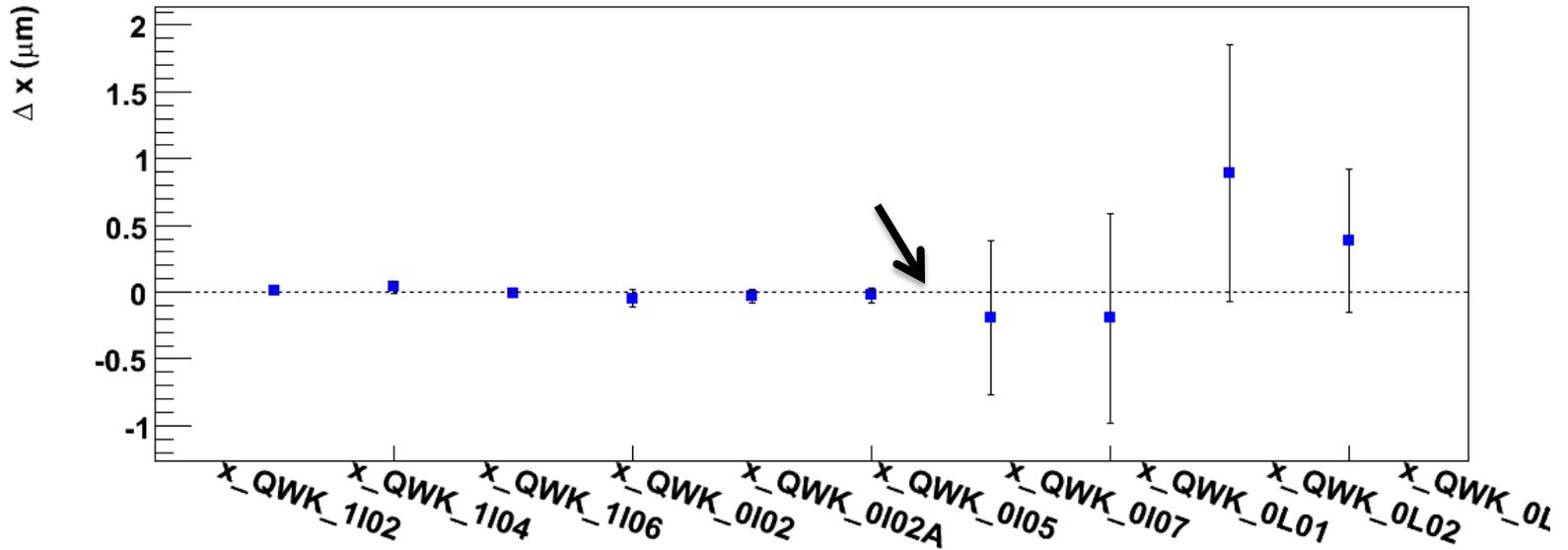
1 kHz



## Transmission of X and Y Position Differences, Run 677

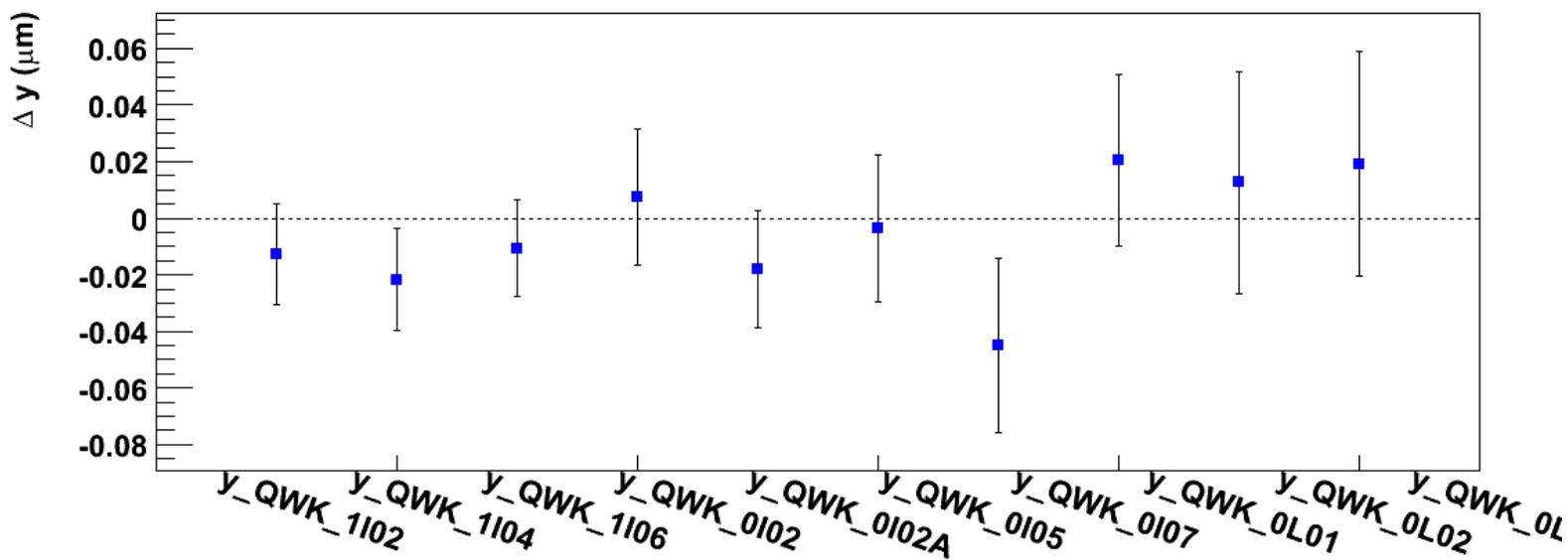
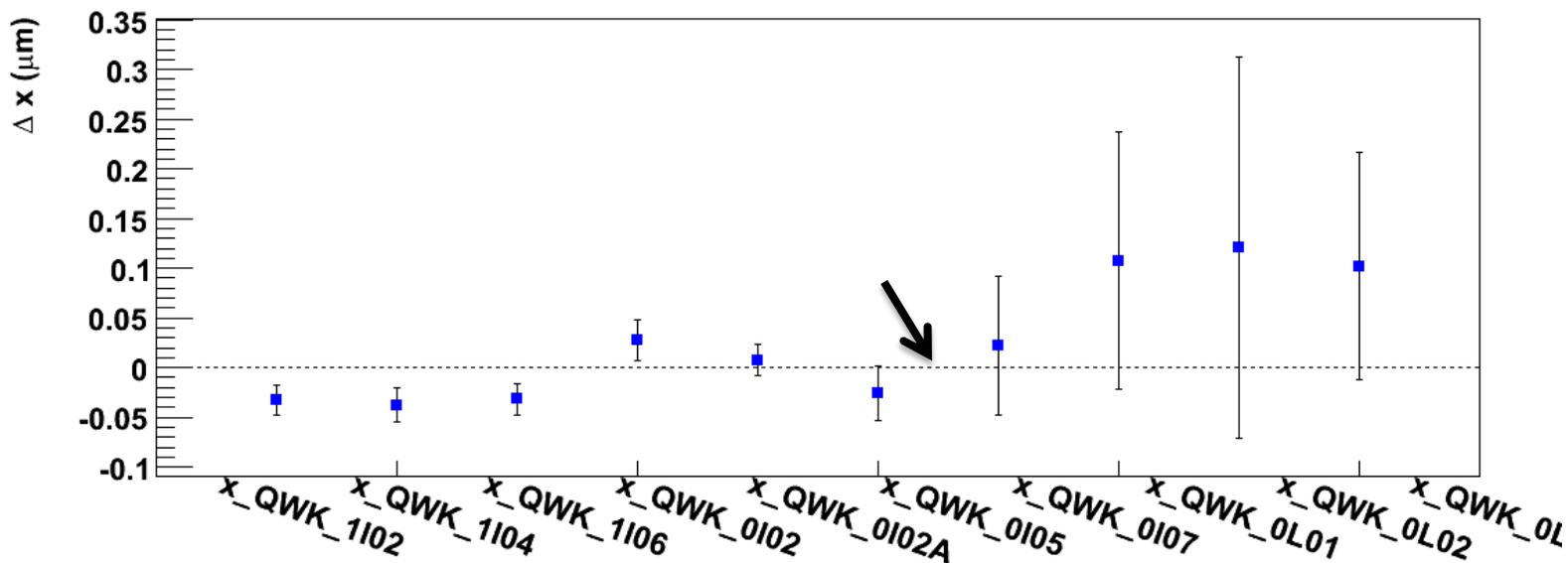


## Transmission of X and Y Position Differences, Run 391

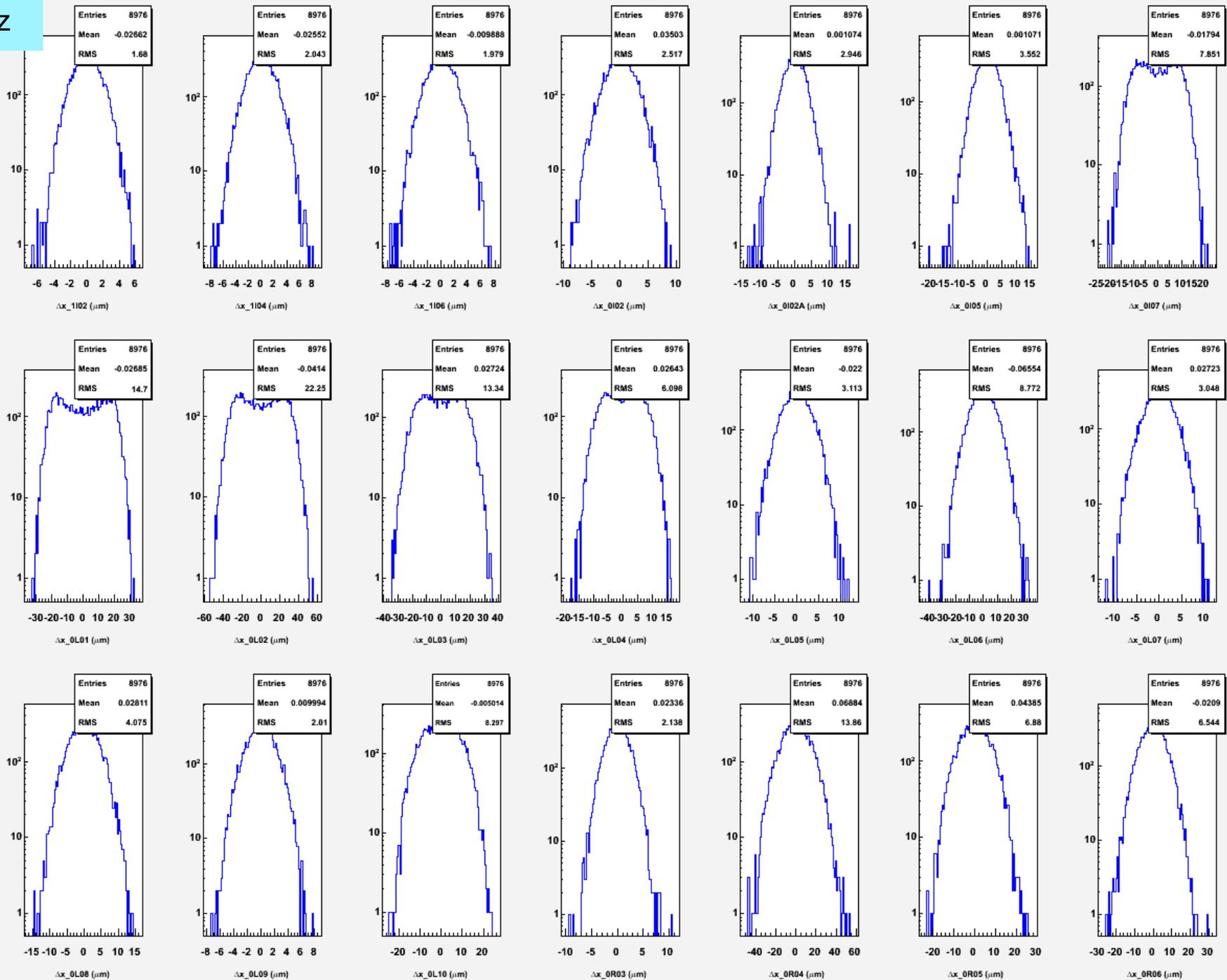


1 kHz

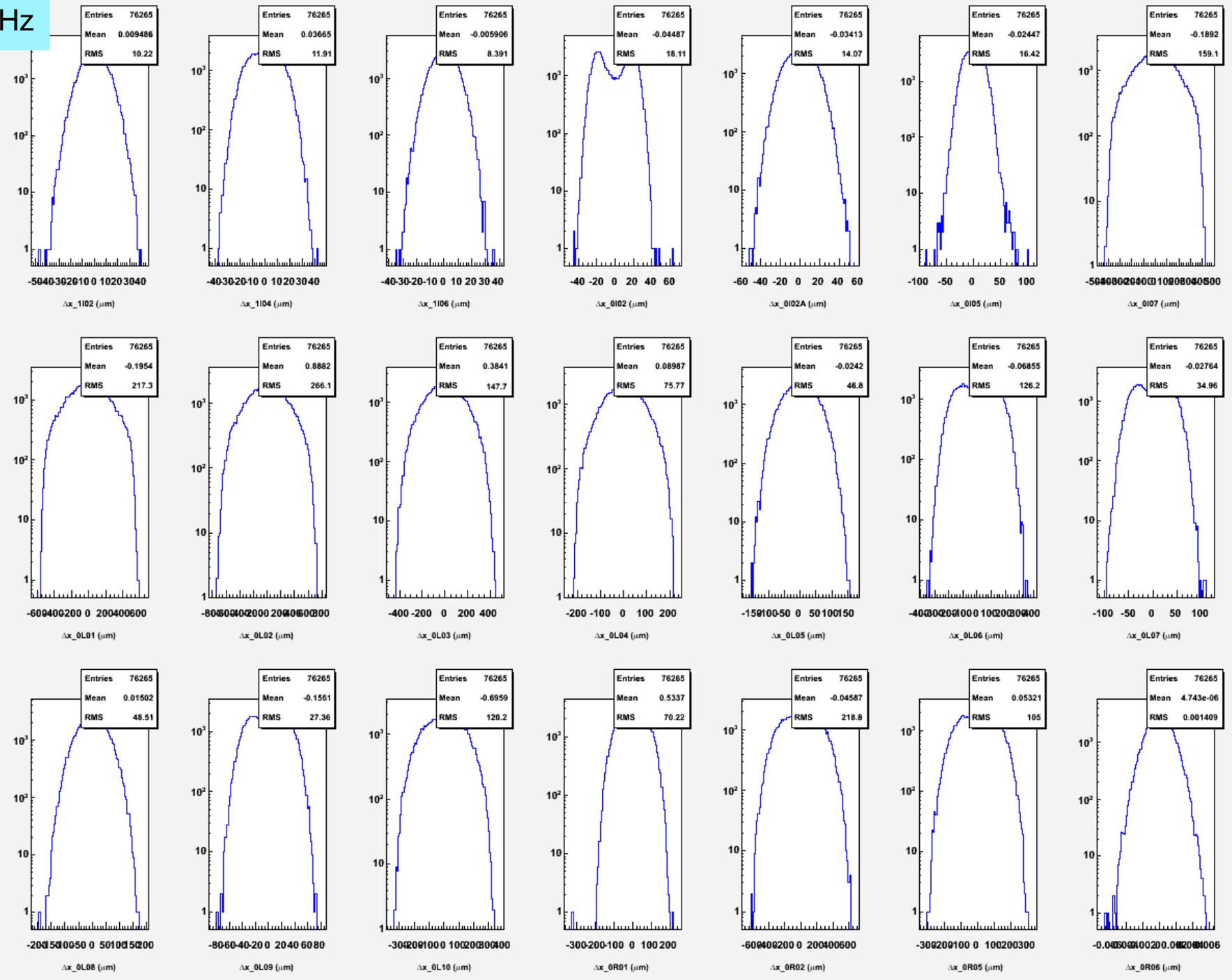
Transmission of X and Y Position Differences, Run 707



30 Hz



# 250 Hz



1 KHz

