

## A Simple Calibration of BTS Q1

September 2, 2006

Hiroshi Nishimura  
Advanced Light Source  
Lawrence Berkeley National Laboratory

By using a BTS frame grabbers as beam position monitors, we can characterize BTS Q1 during the user time as we do not have to turn on BTS bends. ( Here characterization means to find a coefficient of quad current and its K value.)

Here is the beginning of BTS.



There is no bend between TV1 and TV2. Detune HCM1 to create the horizontal orbit distortion and measure the beam movement at TV1 and TV2:

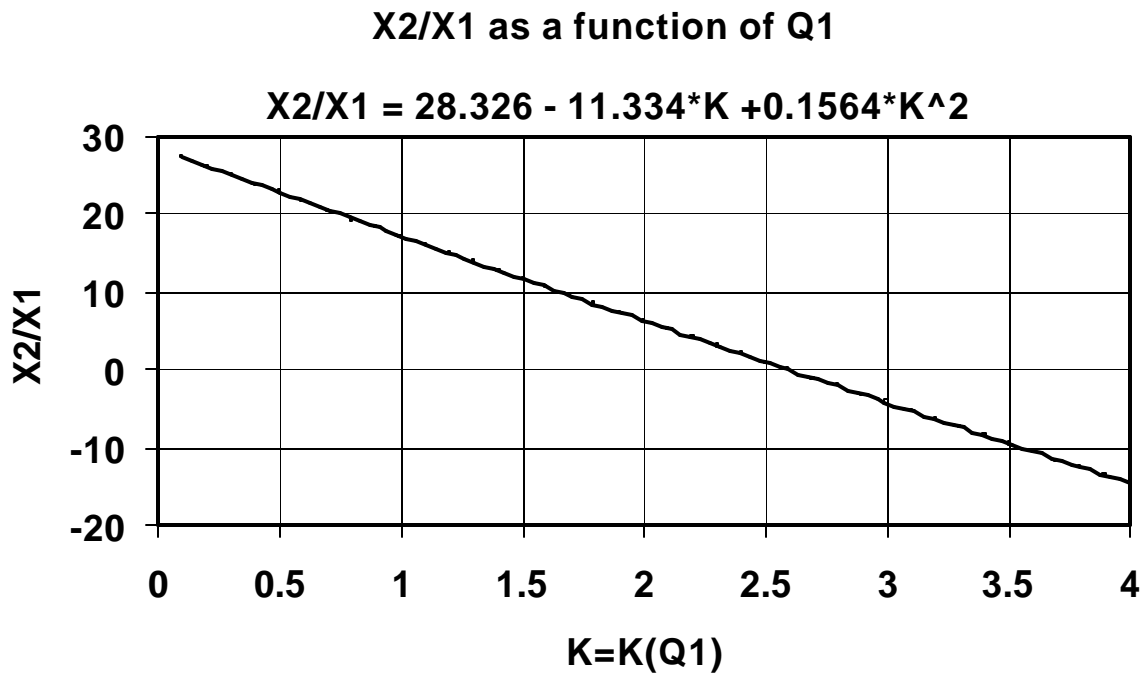
Measure  $X1 = X$  changed at TV1, and  $X2 = X$  changed at TV2.

As you know well, the nominal setting of Q1 gives a vertically longer beam spot at TV2, which is good for horizontal position measurement.

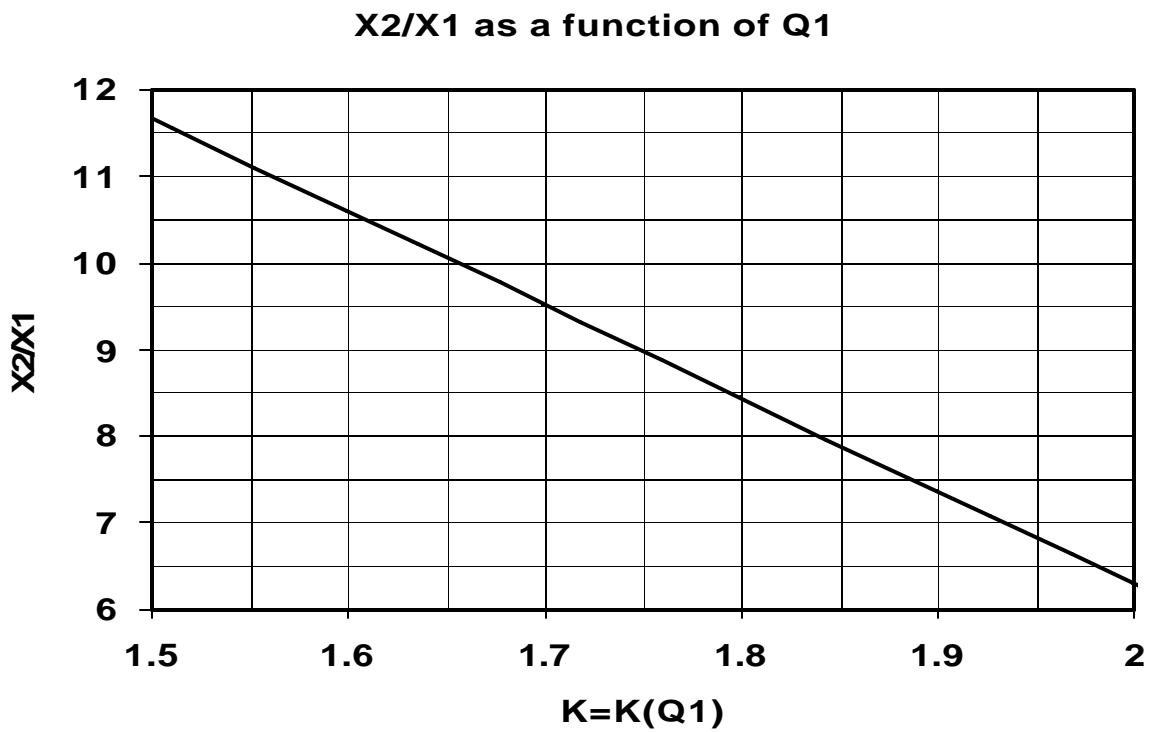
Step 1. Vary HCM and measure  $X2/X1$ . (Hope it is constant.) If TV1 and TV2 have the same geometry, there is no need to "calibrate" the TVs.

Step 2. Vary HCM for several different values of Q1, and measure  $X2/X1$ . should be a linear function of the Q1 strength.

Once you can measure  $X2/X1$ , the K value of Q1 is given by the line on the next page.



Hope we have K in the range shown below.



Once Q1 is characterized, which means that we can get its K value, we can go onto the BR coupling measurement.