BNL-104811-2014-TECH

AGS/AD/Tech Note No. 395;BNL-104811-2014-IR

# A 3/2 LAMBDA BUMP TO CORRECT AGS ORBIT DISTORTION AT THE K17 GAMMA-TR QUAD

E. Auerbach

May 1994

Collider Accelerator Department

**Brookhaven National Laboratory**

**U.S. Department of Energy**

USDOE Office of Science (SC)

# DISCLAIMER

Accelerator Division
Alternating Gradient Synchrotron Department
BROOKHAVEN NATIONAL LABORATORY
Upton, New York 11973

Accelerator Division
Technical Note

**AGS/AD/Tech. Note No. 395**

# A 3/2 LAMBDA BUMP TO CORRECT AGS ORBIT DISTORTION AT THE K17 GAMMA-TR QUAD

E. H. Auerbach

May 12, 1994

# A 3/2 LAMBDA BUMP TO CORRECT AGS ORBIT DISTORTION AT THE K17 GAMMA-TR QUAD

A set of eight magnets were chosen to produce a 3/2-lambda bump with maximum orbit movement of 10.3mm to the inside at the K17 straght section. (A High-Field Horizontal Tune Quad and one of the six Gamma-Transition Quads are located in this straight section.) The residual distortion outside the bump is constrained to approximately 0.3mm.

The particular magnets were chosen to give maximum movement at the Beta-maximum in the "17" straight section and to have an average phase advance between alternate pairs of 1.0*pi. Modelling was done with MAD and the magnitudes of magnet movements adjusted to reduce residual distortions. The model AGS was operated at tunes:

Q-h = 8.830
Q-v = 8.850

The resulting moves required are:

DX =-1.4 mm at J16

DX = 1.1 mm at J17

DX= -1.2 mm at K10

DX= +1.6 mm at K11

DX= +1.4 mm at L3

DX= +1.4 mm at L4

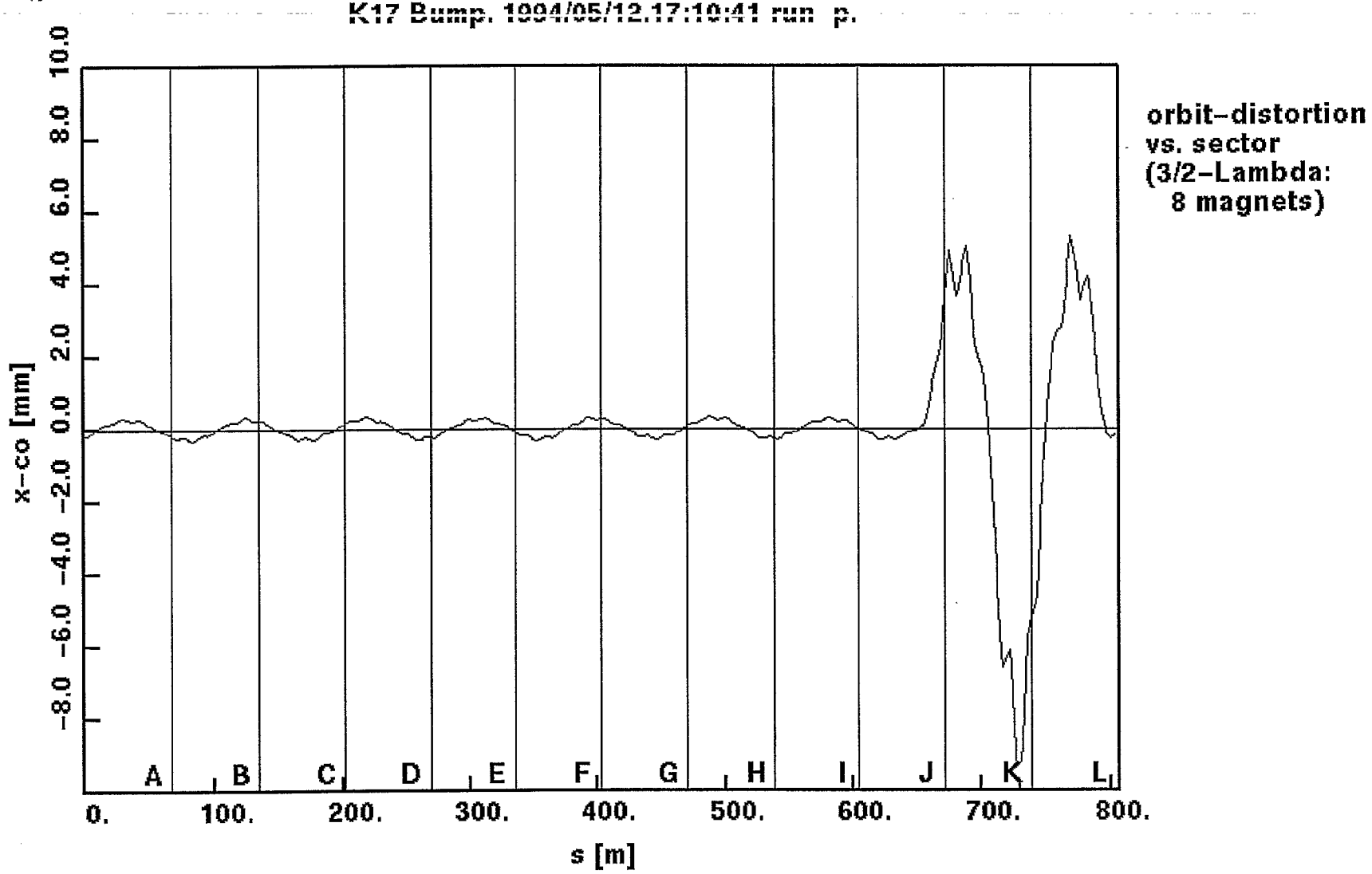
DX = 1.1 mm at L17

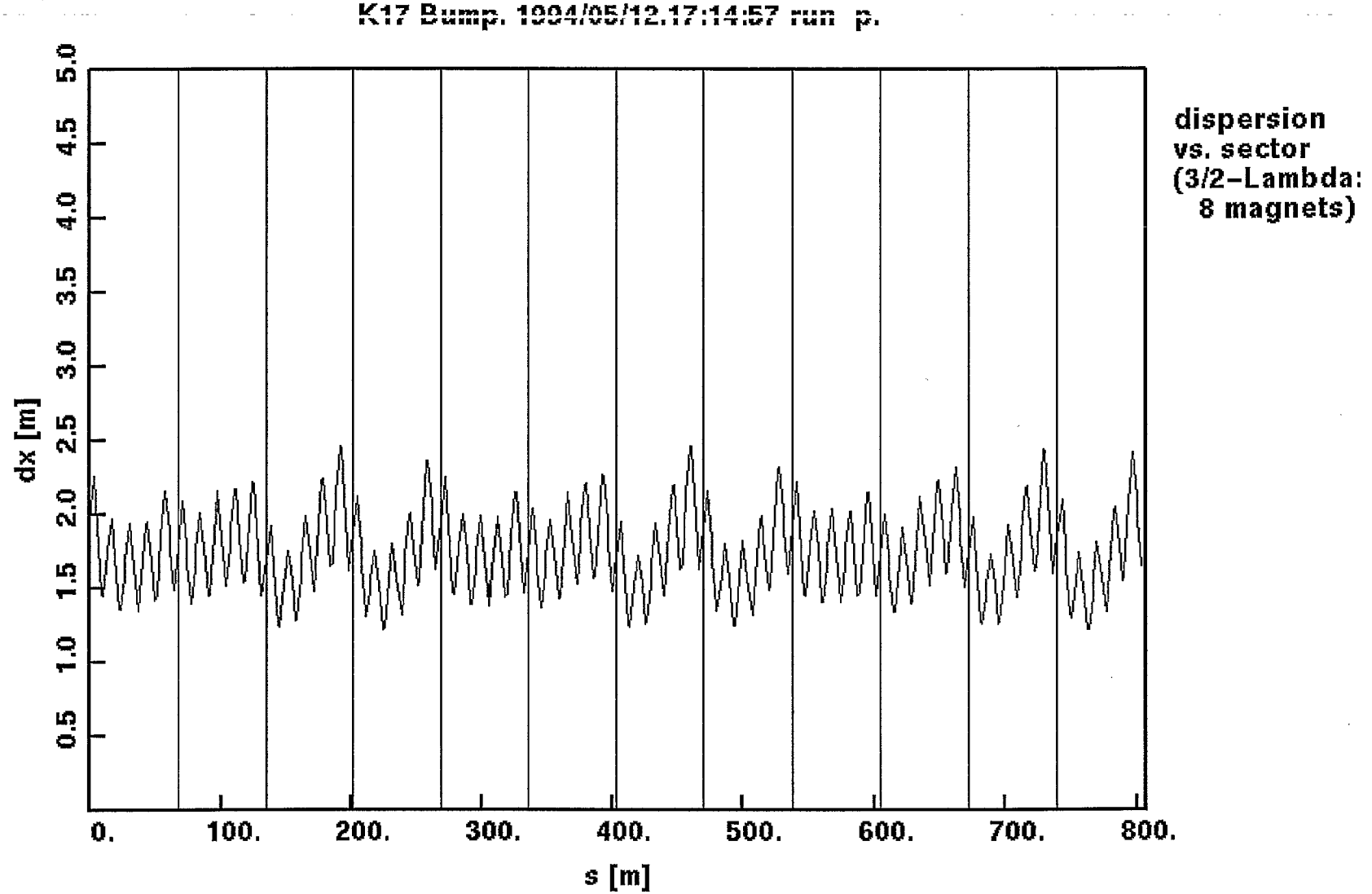
DX = 1.1 mm at L18

Figure 1 gives a plot of the resulting orbit-distortion (in mm) around the ring.

Figure 2 gives the dispersions (in m). Note the presence of a visible 3rd harmonic in the dispersion function.

The Courant-Snyder parameters Beta and Alpha do not exhibit this (3rd harmonic) behavior.


K17 Bump. 1994/05/12.17:10:41 run p.
orbit-distortion
vs. sector
(3/2-Lambda:
8 magnets)
x-co [mm]
10.0
8.0
6.0
4.0
2.0
0.0
-2.0
-4.0
-6.0
-8.0
A
B
C
D
E
F
G
H
I
J
K
L
0.
100.
200.
300.
400.
500.
600.
700.
800.
s [m]


K17 Bump. 1994/05/12.17:14:57 run p.
dispersion
vs. sector
(3/2–Lambda:
8 magnets)
dx [m]
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
0.
100.
200.
300.
400.
500.
600.
700.
800.
s [m]