- Title

A Super-Strong Permanent Magnet Quadrupole with Variable Strength

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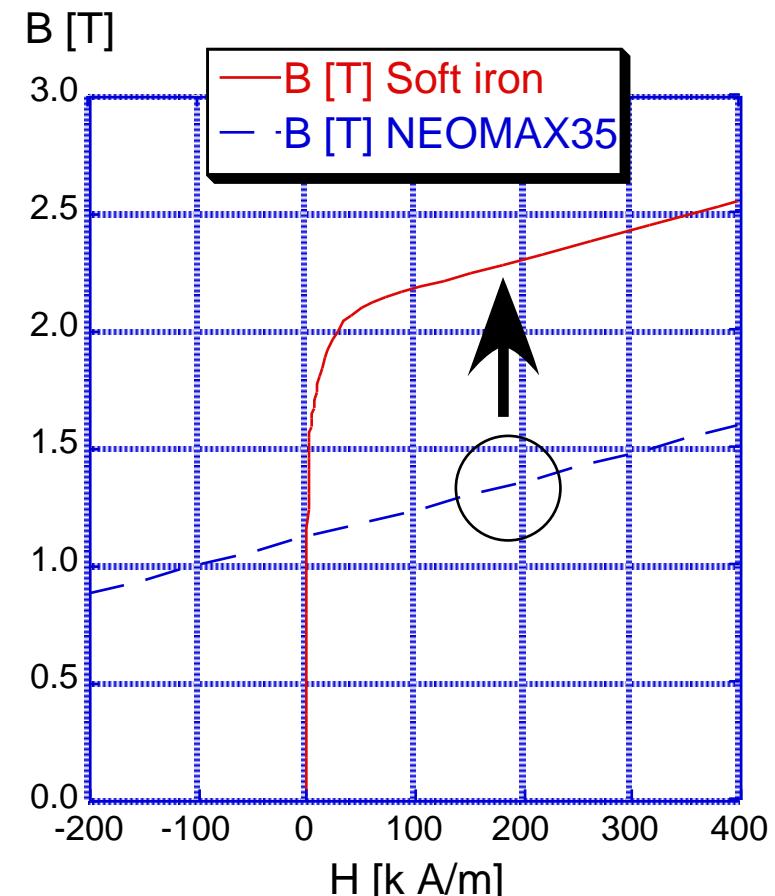
- PMD & B-H curve

Halbach's dipole REC magnet.

r_1

Beam axis r_2

1.37 T @r_1, r_2=1cm, 4cm

B [T]

3.0

— B [T] Soft iron

– – B [T] NEOMAX35

2.5

2.0

1.5

1.0

0.5

0.0

-200   -100   0   100   200   300   400

H [k A/m]

$$B=B_r \ln(r_1/r_2) \cos(\pi/M) \sin(\pi/M)/\pi$$

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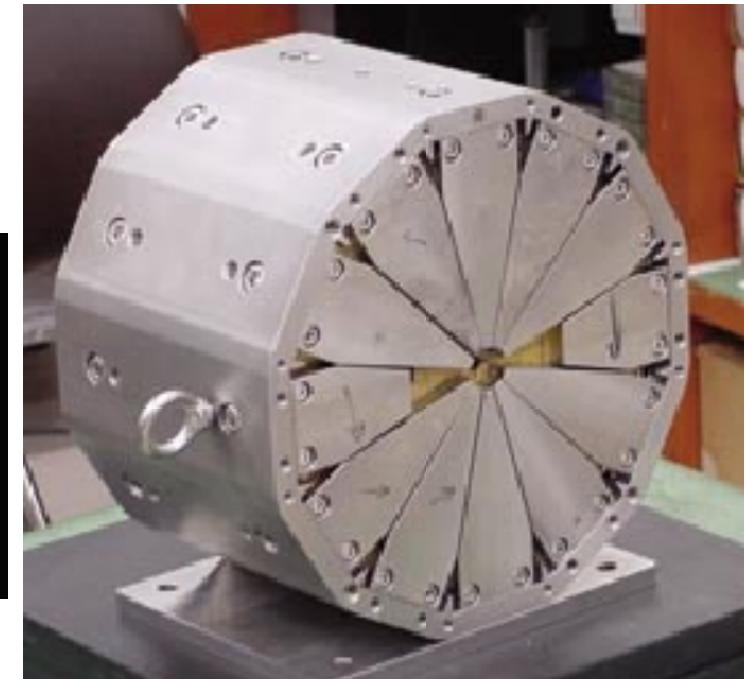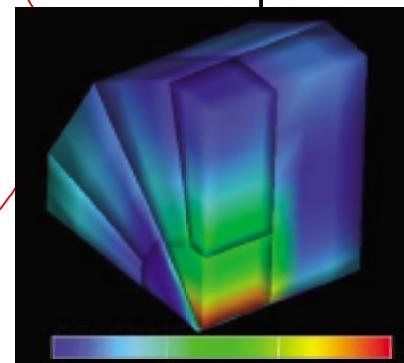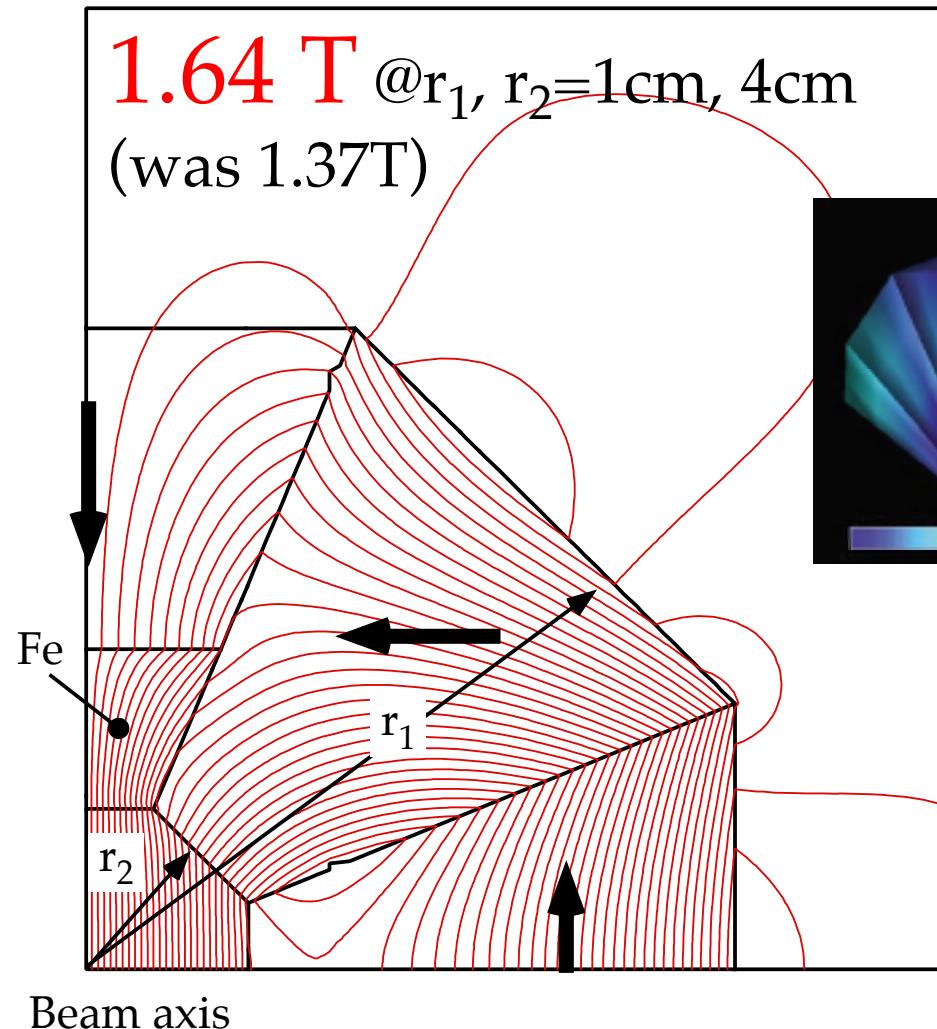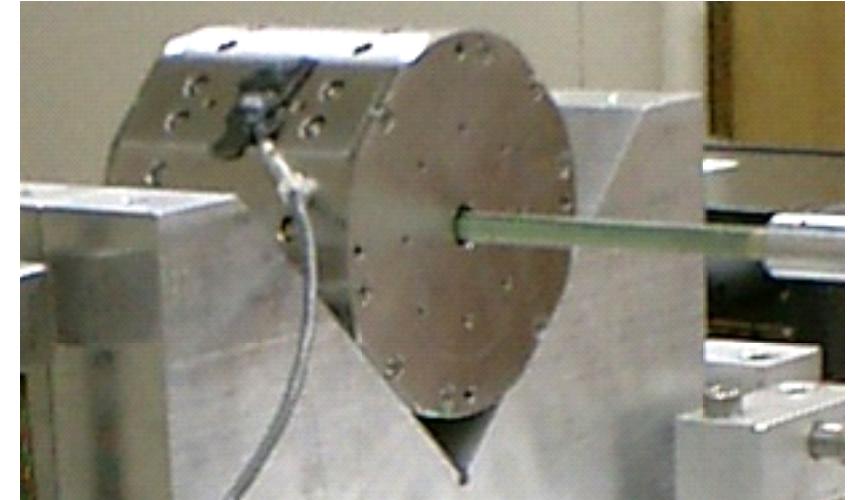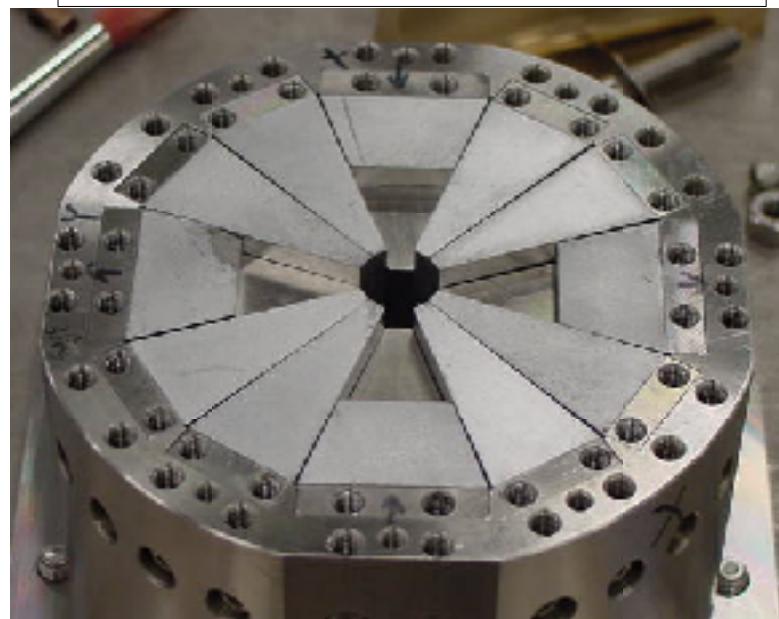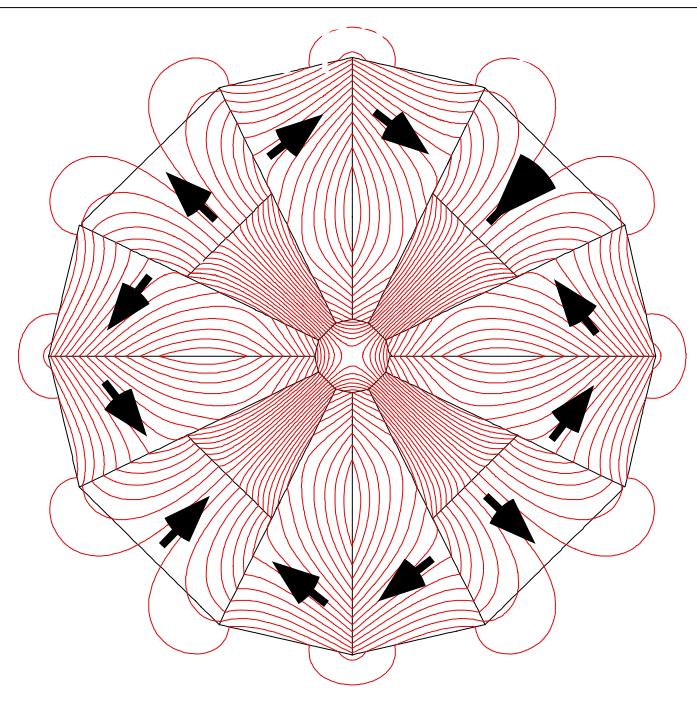
- SuperPMD

Modified Halbach's magnet.

$1.64\ T$ @r_1, r_2=1cm, 4cm
(was 1.37T)

Fe

r_1

r_2

Beam axis

Achieved 4.45T @-29°C
   (3.9T @room temperature)
M. Kumada et al., CERN Courier,
vol. 41, no.7,Sep. 2001, p. 9

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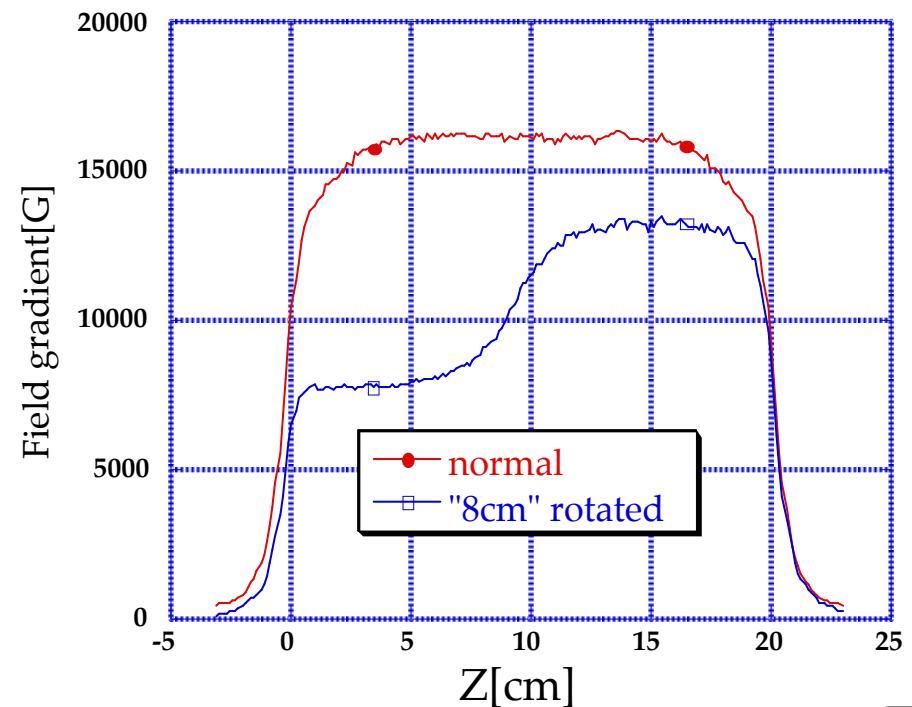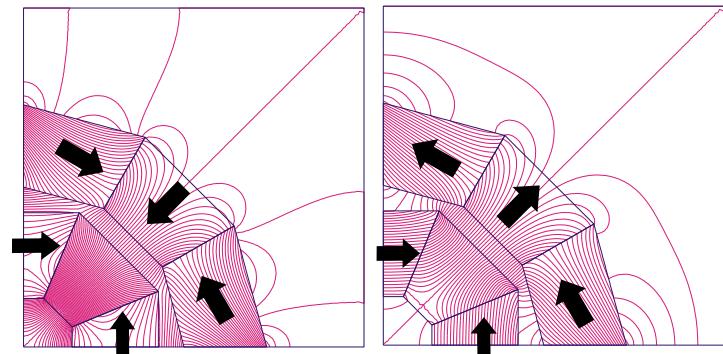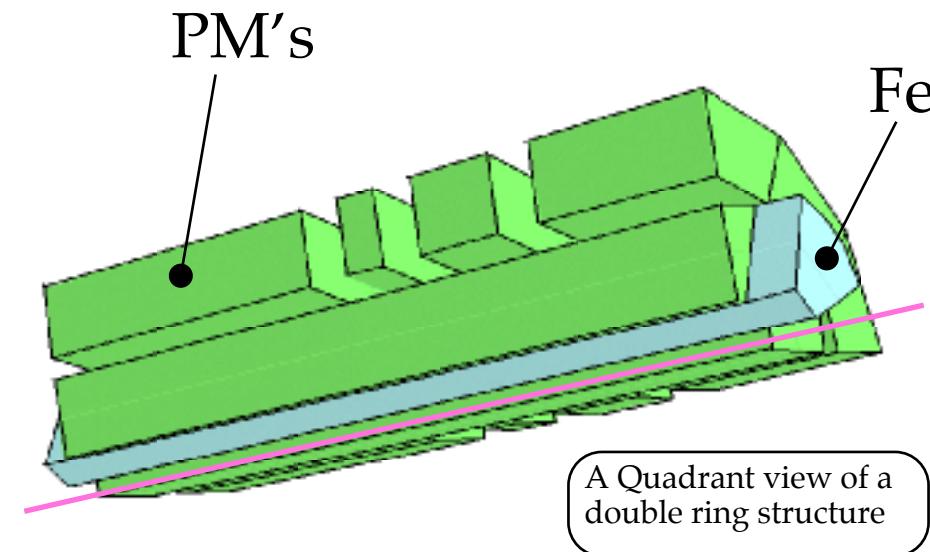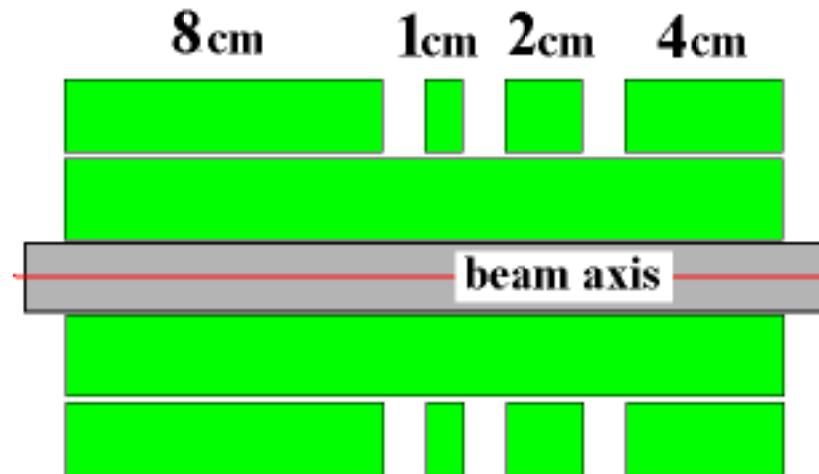
Measured GL value: 28.5T
Calculated GL value: 29.7T
Full length: 100 mm
bore radius: 7mm
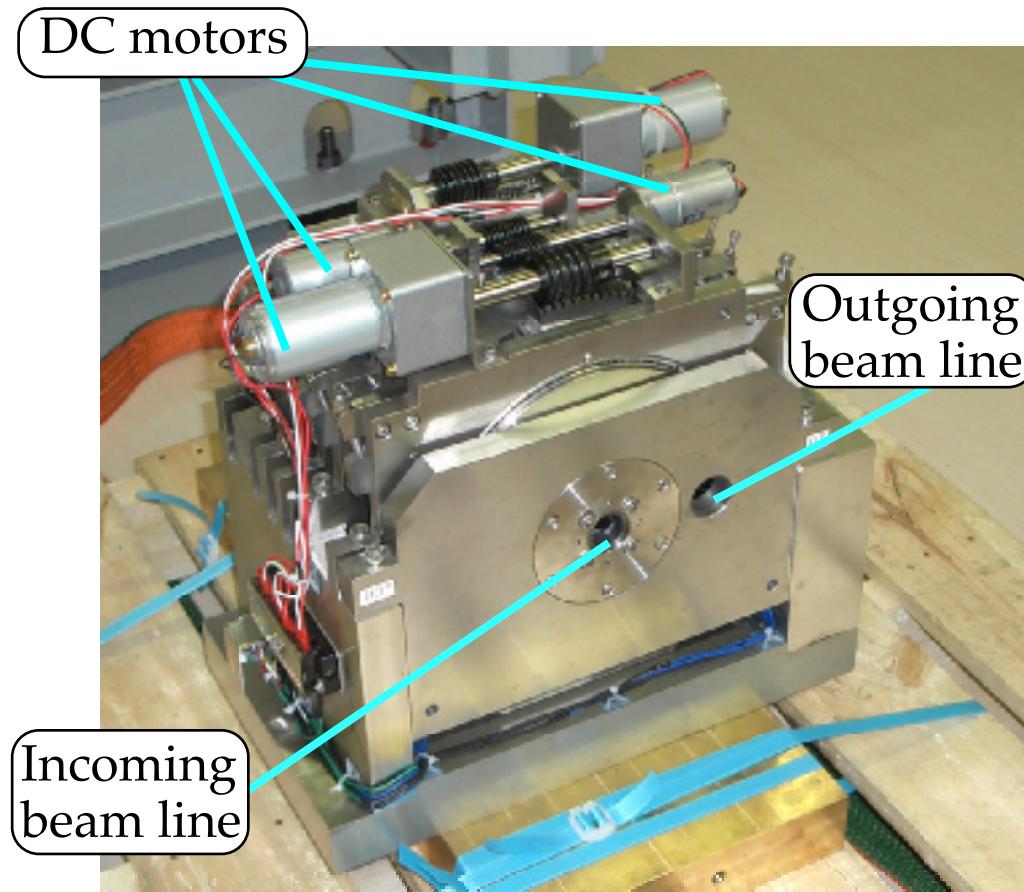
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The adjustable PMQ (with the double ring Structure)

8 cm   1 cm 2 cm   4 cm

beam axis

PM's

Fe

A Quadrant view of a double ring structure

Field gradient[G]

- normal
- "8cm" rotated

Z[cm]
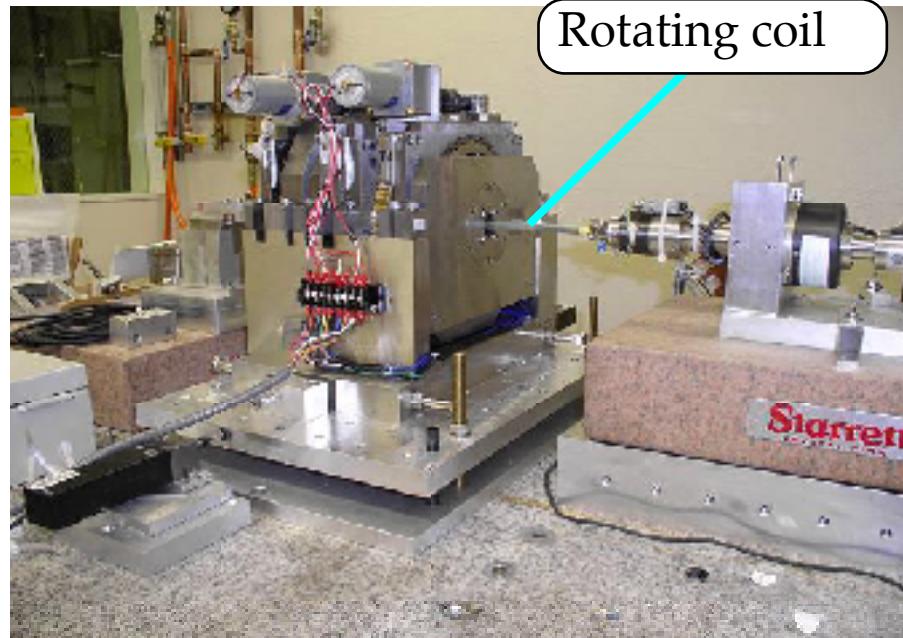
# The Second Prototype of PMQ

DC motors

Outgoing beam line

Incoming beam line
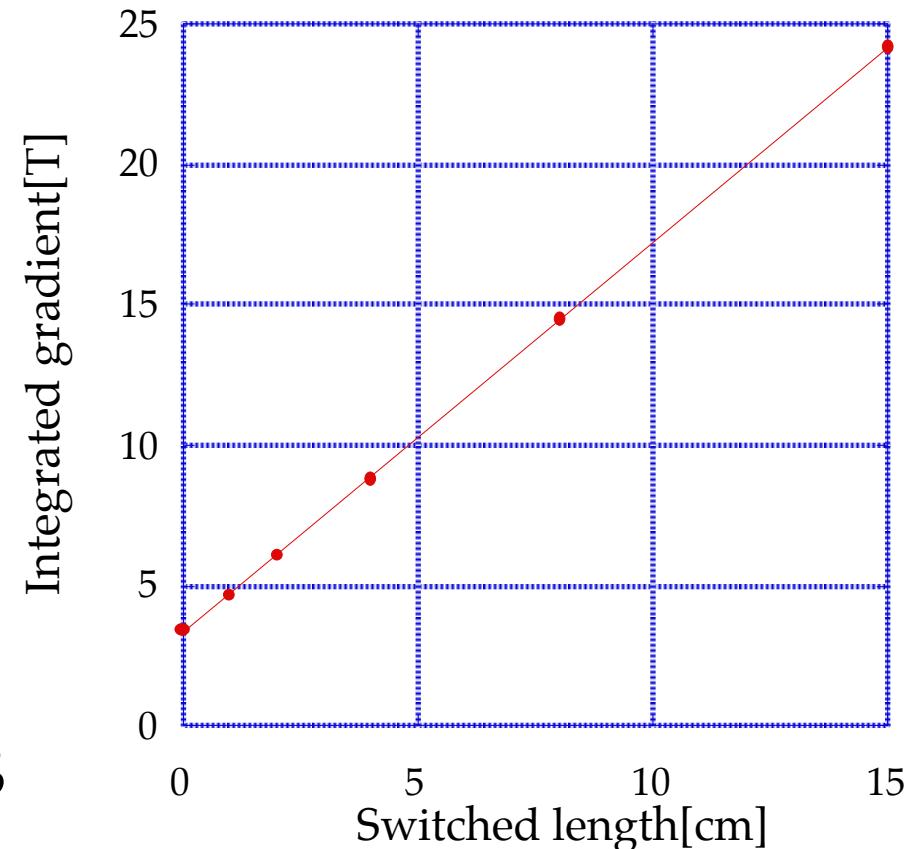
Rotation control box

Worm gears were used as the rotation scheme because worm gear possess small space to produce a large torque.

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Preliminary measurement.
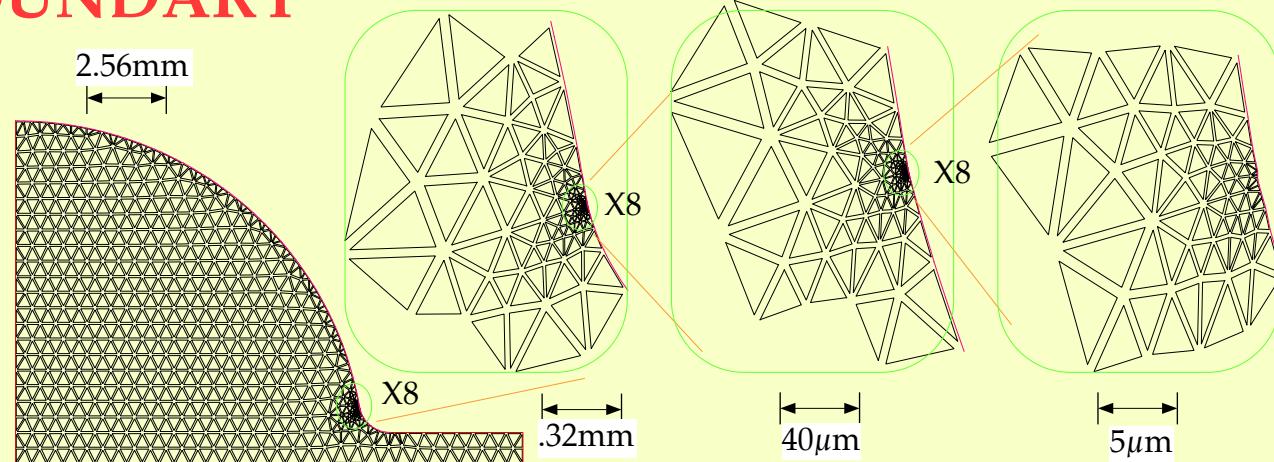
Rotating coil

The measurement is being performed with rotating coil system.

Other posters

EVALUATION OF MAGNETIC FIELD ENHANCEMENT ALONG A BOUNDARY

TUP95

2.56mm

X8

X8

X8

.32mm

40μm

5μm

REDUCTION OF RF POWER LOSS CAUSED BY SKIN EFFECT

THP43

Y

vacuum

conduc-tor

vacuum

conduc-tor

vacuum

$H_z = {}_0e^{iw}_t$
H

$H_z = 1/2 \, {}_0e^{iw}_t$
H

$H_z = 0$

X

d

d

X=0

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