

Emittance Measurements at 750 keV, 10 MeV and 200 MeV

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April 1973

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U.S. Department of Energy

USDOE Office of Science (SC)

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An attempt was made to measure the emittance at 50 KeV, 10 MeV and 200 MeV to determine a width in milliradians through the 200 MeV diaphragm. Successful measurements were made at 750 KeV and 10 MeV but in moving the amplifiers to the 200 KeV location a problem developed and no 200 MeV data was taken by the slit method. SER profiles were taken at 200 MeV and that data is included with the 50 KeV and 10 MeV data for comparison. The results are as follows:-

| LOCATION | NORMALIZED 90% EMITTANCE (EPR) | | BEAM CURRENT |
|----------|--------------------------------|---------------|--------------|
| | HORIZONTAL | VERTICAL | |
| VB # 5 | 0.68 cm mRad. | 0.50 cm mRad. | 75 mA |
| 10 MeV | 1.62 cm mRad. | 1.13 cm mRad. | 50 mA |
| 10 MeV | 1.08 cm mRad. | 1.40 cm mRad. | 50 mA |

| | |
|--------------------------------------|-----|
| EMITTANCE UNIT LOCATION | VBS |
| PLANE OF MEASUREMENT | HDR |
| EMITTANCE UNIT NUMBER | 2 |
| BEAM CURRENT IN MILLI. AMPS. | 75 |
| THRESHOLD STEP SIZE IN MILLI. VOLTS. | 20 |
| NOISE LEVEL IN MILLI. VOLTS. | 5 |
| UPPER LEVEL IN MILLI. VOLTS. | 500 |

XBEAM CURRENT VS. PHASE SPACE AREA

| | | |
|---------|--|----------------|
| 100.00< | | * 29.53 |
| | | * 21.87 |
| 90.00< | | * 16.87 at 90% |
| | | * 14.32 |
| 80.00< | | * 11.99 |
| | | * 10.44 |
| 70.00< | | * 8.658 |
| 60.00< | | * 7.437 |
| | | * 6.327 |
| 50.00< | | * 5.217 |
| | | * 4.662 |
| 40.00< | | * 3.663 |
| 30.00< | | * 2.775 |
| | | * 2.442 |
| 20.00< | | * 1.665 |
| | | * 1.332 |
| | | * 1.110 |
| 10.00< | | * 0.666 |
| | | * 0.555 |
| | | * 0.333 |

750 KeV VBS #5
HORIZONTAL
BUNCHER #2 ONLY

PLANE OF MEASUREMENT VERT
 EMITTANCE UNIT NUMBER 2
 BEAM CURRENT IN MILLI. AMPS. 75
 THRESHOLD STEP SIZE IN MILLI. VOLTS. 20
 NOISE LEVEL IN MILLI. VOLTS. 5
 UPPER LEVEL IN MILLI. VOLTS. 500

XBEAM CURRENT VS. PHASE SPACE AREA

%I
 100.00< * 24.64

* 16.98

90.00< * 13.88
 - 12.5 at 90%
 * 11.77

* 9.546

70.00< * 7.548

60.00< * 6.549

* 5.772
 * 5.439

50.00< * 4.551
 * 4.107
 * 3.774
 * 3.441
 * 2.775
 * 2.331
 * 2.220

750 KeV VB #5
 VERTICAL

40.00< * 3.441

30.00< * 1.887

* 1.665
 * 1.554

20.00< * 0.999
 * 0.999

10.00<

RRER 0.500CM. MRADS. PER POINT

| | |
|--------------------------------------|------|
| PLANE OF MEASUREMENT | VERT |
| EMITTANCE UNIT NUMBER | 3 |
| BEAM CURRENT IN MILLI. AMPS. | 50 |
| THRESHOLD STEP SIZE IN MILLI. VOLTS. | 20 |
| NOISE LEVEL IN MILLI. VOLTS. | 5 |
| UPPER LEVEL IN MILLI. VOLTS. | 500 |

BEAM CURRENT VS. PHASE SPACE AREA

NI * 10.63
 100.00<

* 6.625
 90.00< 7.5 at 90%

* 5.000

80.00< * 4.125

* 3.250

70.00<

* 2.875

* 2.500

60.00<

* 2.125

10 MeV VERTICAL
 BUNCHER #2 ONLY

50.00<

* 1.625

* 1.375

40.00<

* 1.000

30.00<

* 0.750

* 0.625

20.00<

* 0.375

10.00<*

0.250

RRER 0.300CM. MRADS. PER POINT

PLANE OF MEASUREMENT HOR
 EMITTANCE UNIT NUMBER 3
 BEAM CURRENT IN MILLI. AMPS. 50
 THRESHOLD STEP SIZE IN MILLI. VOLTS. 20
 NOISE LEVEL IN MILLI. VOLTS. 5
 UPPER LEVEL IN MILLI. VOLTS. 500

BEAM CURRENT VS. PHASE SPACE AREA

21
 100.00K * 20.00

90.00K * 11.88
 10.8 at 90%

..... * 8.750

80.00K
 * 6.375

70.00K * 5.750

..... * 4.625

60.00K * 3.875

10 MeV HORIZONTAL
 BUNCHER # 2 ONLY.

..... * 3.375

..... * 3.000

50.00K
 * 2.750

..... * 2.250

40.00K

..... * 1.875

30.00K

..... * 1.375

..... * 1.125

20.00K

..... * 0.750

10.00K

..... * 0.375

..... * 0.250

AREA 0.400CM. MRADS. PER POINT