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Beam size measurements at ISABELLE intensity; 4 X 1012/pulse

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Date 1/31/77 Time 1100-1245 Experimenters E. Raka

Subject Beam Size Measurements at ISABELLE Intensity; 4×10^{12}/Pulse

OBSERVATIONS AND CONCLUSION

1) Setup: The AGS was retuned to give 4×10^{12} with 45-50 μsec of an 80 ma beam from the linac. Changes were made in the RF amplitude and frequency programs; injection peaker; the bump coil timing; Nu quads, and the transition phase jump and timing in order to pass transiton with no phase space dilution.

2) Procedure: The J-19 vertical targets were flipped so as to produce a 2% beam loss at five different times. (Due to a calibration error of 5, it was the 2% not the 10% size that was obtained.) There was not enough time available to make measurements at lower or higher βγ.

3) Results:

Time	βγ	Size	Normalized E/π	95% Value (E/π ≐ 1.3)	
115	2.05	1.55"	36 μrad M	27.7	
172	5.6	1"	40.7 "	31.3	β_{J19} = 22 M
205	7.87	.847"	41.4 "	31.8	
255	11.16	.626	32 "	24.6	
370	18.4	.526	37 "	28.5	

4) Comments: The principal effect seen here is that there was no dilution present after the transition energy of ≈ 8.5 GeV is passed (t ≈ 214 msec). This is in contrast with the results obtained at high intensity ($8\text{-}10 \times 10^{12}$). Unfortunately, there was not time enough to check the rather low value observed at 255 msec. However, it seems clear that there are intensity dependent effects taking place in the range of βγ = 6-11 that are not significant at ISA intensities.

The beam size at high intensity was measured several times during SEB operation for intensities of $8.5\text{-}9 \times 10^{12}$ with the following results. (95% values averaged.)

Time	βγ	Size	E/π	Time	βγ	Size	E/π
105	1.6	1.67"	33	255	11.16	.77	48.7
115	2.05	1.6"	38	370	18.4	.61	50
172	5.6	.965"	38				
205	7.87	.817	38.5				