

ISR RUNNING-INDose measurements near vacuum chamber

Dosimeters capable of measuring accumulated doses in the range of 10^{-1} - 10^9 rad were placed in the Intersecting Storage Rings for the initial running-in period of 29th October 1970 to 13th November 1970. The dosimeters were located on top of the vacuum chamber in Ring 1 at the upstream ends of bending magnets, principally at the areas of expected high beam losses, that is injection and beam dumping.

The dosimeters were of radiophotoluminescent type in which the induced luminescent centers produced by ionizing radiation are released by ultraviolet light. Results obtained with these dosimeters have been found to be in good agreement with the phosphate glass dosimeters widely used at CERN¹⁾. The latter were also placed in the ring, however due to the small sensitivity (5×10^4 - 2×10^7 rad) of these dosimeters, a measurable dose was accumulated only in a few locations.

The measured values are summarized in table 1 and in Fig. 1. The given values correspond to the total injected beam of 1.52×10^{16} protons. An accurate comparison of the measured values to the earlier estimates of the doses to the ISR components is not feasible because the loss patterns during the running-in period have not yet been established. Qualitatively, however, the values when scaled up by a factor of about 240 corresponding to yearly injected beam of 3.7×10^{18} agree with earlier estimates²⁾.

Jorma T. Routti

M.H. Van de Voorde

References:

- 1) J.T. Routti and M.H. Van de Voorde, CERN ISR-MA/70-50
- 2) M.H. Van de Voorde, CERN ISR-MA/68-28

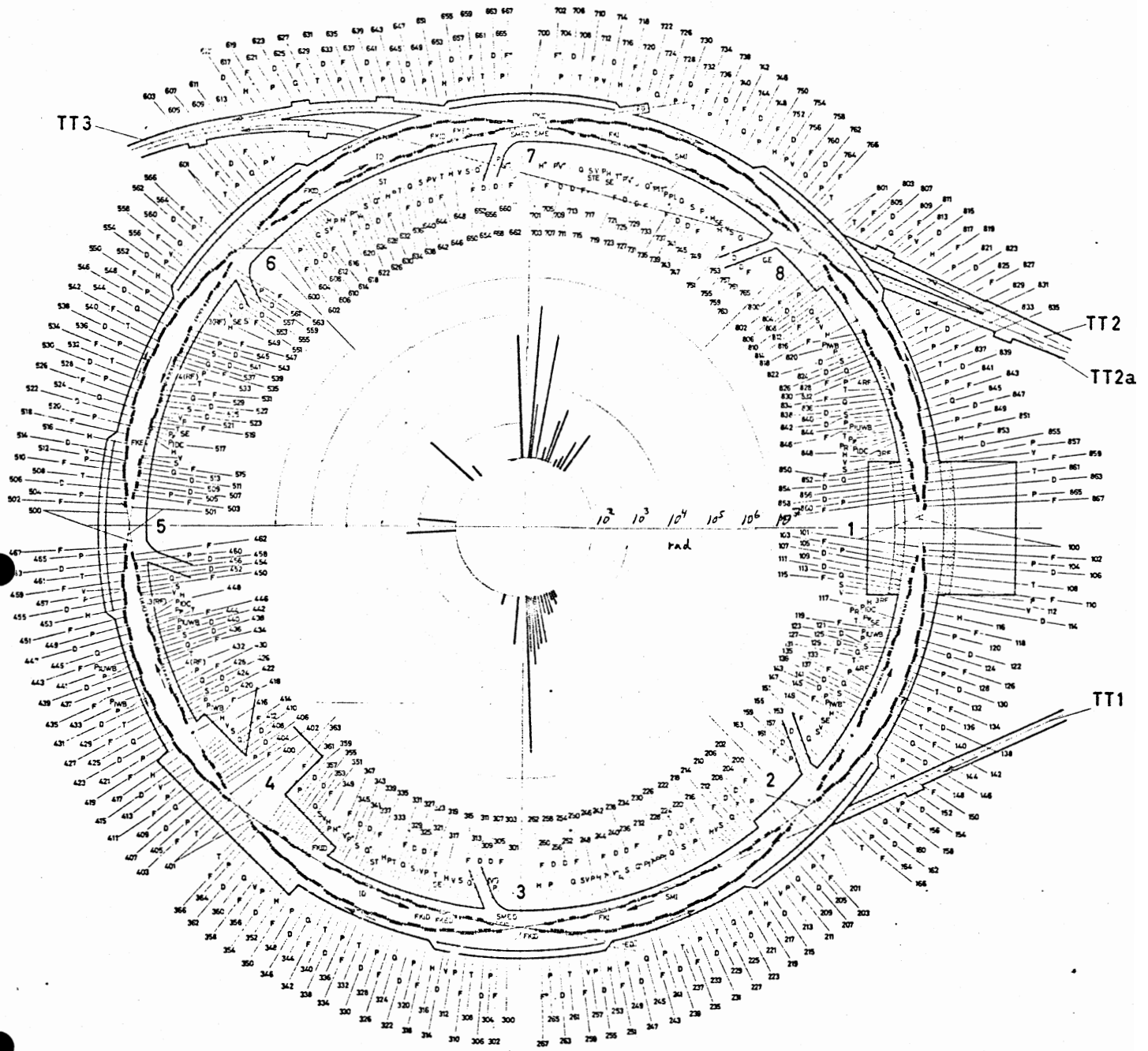
TABLE 1

Measured doses

<u>Location</u>	<u>Dose (krad)</u>	<u>Location</u>	<u>Dose (krad)</u>
Magnet 751	1.2	Magnet 467	1.4
" 747	0.78	" 319	0.17
" 743	0.28	" 303	1.3
" 739	0.14	FKID upstream	1400
" 735	0.045	FKID downstream	14.0
" 731	4.0	Magnet 267	8.2
" 727	1.25	" 263	3.7
" 719	0.26	" 259	2.5
" 715	230	" 255	2.4
" 707	4.3	" 251	0.42
" 703	1050	" 247	0.63
" 667	200	" 243	0.57
" 603	0.15	" 239	0.18
" 563	6.0	" 235	0.48
" 503	1.0	" 231	0.12

Distribution:

Parameter Committee
Running-in Executive Committee
Engineers-in-Charge
Sc.staff ISR-MA



- FKI Fast kicker for injection
- OE Special quadrupole for slow integral ejection
- SE Sextupole for slow ejection
- STE Thin septum magnet for ejection
- SME Thick septum magnet for ejection
- FKID Fast kicker internal beam dumping
- FKED Fast kicker external beam dumping
- SMED Septum magnet external beam dumping
- ID Internal beam dump
- ED External beam dump
- FKE Fast kicker for ejection
- * Special design
- F* Must be with reversed yoke for ejection and external beam dumps.
- ST Scraping target
- PR Radial position pick-up

- F Radially focusing unit
- D Radially defocusing unit
- H Horizontal field magnet
- T Terwilliger quadrupole
- Q Skew quadrupole
- S Sextupole
- V Vacuum sector valve
- P Beam position pick-up station
- Pp Phase pick-up station
- Pi Special pick-up station for injection
- PDC DC intensity pick-up
- PIWB Wide band intensity pick up
- PIUWB Ultra wide band intensity pick-up
- RF RF cavity
- (RF) Space reserved for future RF cavity
- SMI Steel septum magnet for injection