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Note concerning the eventual installation of the electrostatic pick-up in the electron cooling device foreseen for LEAR

(CERN/PS/LI 82-9, 11.6.1982)

N. Pearce

At the meeting held on September 28, 1982, the following points were raised and decisions taken.

Provided that sufficient money can be made available for both mechanical and electronic equipment, a total of four pick-ups will be installed in the electron cooler. The position will be as proposed by M. Poth in his note i.e.:

1. at the end of the gun drift tube
2. at the entrance and exit of the cooling system (i.e. 2 pu)
3. at the entrance of the collector drift tube.

To accommodate the beam profile for the positions (2) (vertical dimension 44 mm and horizontal dimension 128 m, Ref. D. Mohl) a tube size Ø 140 (internal diameter) has been accepted. This tube will be identical with the Booster type "f" electrode.

For the positions 1 and 3 a tube internal diameter of 100 mm has been chosen to be consistent in diameter with the existing internal shields.

It is proposed that the Ø 100 pick ups be available for installation in February 1983 and those of Ø 140 for installation in August 1983.

Following is a résumé of the estimated cost for the supplying and preparation of the mechanical components.

Cost estimate for mechanical components of pick ups in electron cooler

Ceramics complete with plating & brazed inserts	4200/pc.
Machined vacuum tight housing for ceramic tube	2200/pc.
Continuation of vacuum tube (flanges Ø 215 etc.)	2960/unit
Vacuum feedthroughs (modified)	600/unit
Small mechanical details: pins/contacts/cap for feedthrough	300/unit
	10.260.-
Price for 4 units	41.040
Additional cost for tooling for Ø 100 pick up	4.000
TOTAL	45.040 SFrs.

N. Pearce
30.9.1982

Rough estimates of cost and performance for 4 (8 planes) position measuring pick-ups in electron cooler

D.J. Williams

Assume Network Analyser 3570A can be borrowed (time shared at no cost) with LEAR Closed Orbit Observation System.

Proposal

1. Provide 4 horizontal and 4 vertical analogue signals $\sim$ 120 metres from ring. System band-width 2 kHz to 30-40 MHz can be extended to 50 MHz with cable loss compensation. Noise equivalent input < 5 nV/Hz, CMRR 60 dB 2 kHz to 10 MHz gives useful analogue observation from 10^8 $\bar{p}$ (5×10^8 $\bar{p}$ noise = 2% of $V\Sigma$ with 20 MHz band-width on CRO). For electrons signals noise will be much less than 1% with 100 mA electron current and 30% modulation at 10 kHz.

2. Ratio of Δ to Σ is to be measured by HP Network Analyser 3570A and a useful range of measurement should be possible from 10^7 to 10^{11} $\bar{p}$; the low end is still to be determined but probably limited to 10^7 by EMI from RF cavity. Multiplexing of signals at 4 to 5 millisecs rate per position measurement. Independent outputs for completely independent computer system.

Cables	16 x (120 + 50) RG 214 + Multiwire	10.000 -
Power supplies	∿4A ± 24 NIM crate ? or local	4.000 -
Head amplifier (8)	use LEAR spares	
	Mechanics 8x	4.000 -
	P.C. boards 8x	500 -
	Relays a x 8	1.000 -
Foot amplifier (4)	Mechanics	3.000 -
	P.C. boards	300 -
	Relays etc.	(1.000 -)*
Reception amplifier (4)	P.C. boards + mechanics	1.000 -
Electronic components for all		∿ 3.000 -
Control logic + ADCs + Computer Interface		∿ 3.000 -
Multiplexing of signals		1.000
[Assume HP 3570A can be used in parallel with LEAR closed orbit ?]		
		31.800 -

D.J. Williams
30.9.1982