Strada terrino

MPS/EP
JM/hm

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THE CPS IMPROVEMENT PROGRAMME

List of Headings

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1. INTRODUCTION :

The purpose of this list is to present a picture of the subjects which are involved when considering a CPS improvement programme. No attempt has been made to compile all questions involved but those which are important from a technical or budgetary point of view are traced.

One made a list of subjects which one believes are of some primary and some secondary importance. The list resulted from discussions with : H. Fischer, J. Geibel, M. Georgijevic, P. Germain, H.G. Hereward, M. Lapostolle, G.L. Munday, K.H. Reich, P.H. Standley, C. Taylor.

The subjects are grouped under the following headings :

- The new injector.
- Electrical power supply and cooling.
- RF and ejection equipment.
- Experimental planning and experimental areas.
- Exploitation of the high intensity CPS. (prepared by K.H. Reich).

Comments to J. Madsen are welcome ..

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2. SUBJECTS OF PRIMARY IMPORTANCE FOR THE IMPROVEMENT PROGRAMME :

2.1 The new injector :

2.1.1 The main parameters of the injector proposed.
An explanation will be given why 200 MeV is a convenient upper limit t.

2.1.2 Multiturn or high current injection into the PS.

2.1.3 Acceleration of deuterons.
An analysis of the technical differences between a pure proton injector and a multi purpose injector (protons and deuterons).

2.1.4 The selection of the injection position in the PS.

2.1.5 The layouts of the injector installations.

2.1.6 The electrical power and cooling requirements.

2.2 Electrical power supply and cooling :

2.2.1 Technical information on the proposals to change the repetition rate and the flat top time of the PS magnet power supply.

2.2.2 The layouts of the new PS magnet power supply system.

2.2.3 Technical information on the required changes in the present PS magnet cooling system.

2.2.4 A prediction on the expected life of the insulation materials used on the PS magnet units.

2.3 RF and ejection equipment :

2.3.1 New RF cavities.
Two cases will be considered :
a) acceleration of 200 MeV protons with $\dot{B}$ double of present value.

b) acceleration of 200 MeV protons and of 80 MeV deuterons possible.

B double for p-acceleration but not necessarily for d-acceleration.

The aim is to find a technical solution which asks for a small number of straight sections and an elimination of the radiation damage problem.

2.3.2 Solutions to obtain a slow ejection efficiency above 90%

2.4 Experimental planning and experimental areas :

2.4.1 The possible experimental use of a high intensity proton and a deuteron beam on an internal target.

2.4.2 The future uses of experimental areas : internal or external targets or ejection or combination of these.

2.4.3 The use of an external target.

2.4.4 Possible straight section rearrangements to increase the performance of an internal target or to accommodate high slow ejection efficiency.

2.4.5 Changes in the existing experimental areas and their associated ring areas in order to improve their usefulness.

2.4.6 Evaluation of the needs for a new experimental area. Specifications and possible locations of such an area.

2.5 Exploitation of the high intensity P.S.

(prepared by K.H. Reich.

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2.5.1 Verification of the present assumption that the existing CPS shielding would permit a fourfold increase of accelerated protons lost in the ring, using current practice from the point of view radiation safety during both operation and maintenance. Verification that outside targets can be shielded "perfectly".

2.5.2 Methods and ways to reduce maximum radiation dose rates received by people working in the CPS ring.

2.5.3 Evaluation of radiation dammage to CPS to be expected from higher intensity and study of counter-measures. Decision on use of internal beam dump.

2.5.4 Evaluation of cost in manpower and money caused by operation of higher intensity CPS (shielding, redesign, spares, special equipment etc.) also considering normal aging.

3. SUBJECTS OF SECONDARY IMPORTANCE FOR THE IMPROVEMENT PROGRAMME :

3.1 The new injector :

3.1.1 Health physics aspects when accelerating deuterons.

3.1.2 Provisions planned to enable acceleration of polarized protons in the future.

3.1.3 Review of the planning outlined in MPS/Int. LIN 64.1

3.2 Electrical power supply and cooling :

3.2.1 The necessity to order spare PS magnet units.

3.2.2 A solution to uncouple and to replace quickly a defect magnet unit from a hot zone.

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3.2.3 The influence on the water activity and water quality by increasing the PS intensity.

3.2.4 The maximum allowable average current in the pole face windings.

3.2.5 Review of the influence of the different proposals to increase the repetition rate and flat top time on the experimental programme.

3.2.6 The additional electrical power supply and cooling required to serve the new experimental area(s).

3.3 RF and ejection equipment :

3.3.1 Pick-up stations having their electronic equipment 10 to 20m away from the electrodes.

3.3.2 The beam control will be improved to satisfy special uses of the beam.

3.3.3 Solutions to obtain with the septum magnet 90% ejection efficiency for burst lengths up to 500 ms at 28 GeV/c.

3.3.4 A full aperture kicker in short straight section.

3.4 Experimental planning and experimental areas :

3.4.1 The possibility to concentrate targets obtaining high intensity beams in a restricted part of the ring.

3.4.2 The desirability and feasibility to extend the existing target facilities for pure irradiation purposes.

3.4.3 The transport methods when the external target is far away from the PS ring. Provisions to assure safe transport of the beam.

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3.4.4 Seen past experience, a recommandation concerning facilities in a new experimental area.

3.5 Exploitation of the high intensity PS.

(Prepared by K.H. Reich)

3.5.1 Detailed purpose, design and proposed operation of internal beam-dump.

3.5.2 Detailed purpose, design and proposed operation of robots and hot storage system.

3.5.3 Detailed redesign of target areas for efficient, safe operation (including ejection in south area).

3.5.4 Detailed design of external beams, and particularly shielding around external targets and beam dumps.

3.5.5 Operational procedures, in particular beam sharing between targets, slow and fast ejection, monitoring of radiation and induced radio-activity in these cases, influence on machine scheduling etc.

Distribution :

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