

PROPOSALS FOR THE UPGRADE OF THE CERN PROTON ACCELERATOR COMPLEX

R. Garoby for the HIP working group (M. Benedikt, K. Cornelis, E. Metral, F. Ruggiero, M. Vretenar)

The High Intensity Proton (HIP) working group was created at the end of the year 2002, with the mandate to make recommendations to the management of the AB department for the future of the CERN complex of proton accelerators. The present performance has been compared with the future needs expressed by the various users, namely the physics experiments dealing with LHC, neutrino, radioactive ion beam, SPS fixed target physics, neutrons and antiprotons. Possible improvements have been identified and a coherent upgrade scenario of the whole accelerator complex has been worked out taking into account the present CERN priorities. Conclusions and recommendations at short, medium and long term will be described and complemented with the outcome of the workshops and discussions held since the publication of the HIP report.

Present performance of the CERN accelerator complex by M. Benedikt

The capabilities and the performance of the CERN accelerator complex are analyzed, based on the present status of the accelerators. This is done by estimating the availability of proton beams for the period 2006 to 2010 and comparing it to the anticipated physics programme, to highlight any possible shortfall. Typical operation scenarios with yearly running periods and machine availabilities are defined, including specific assumption for LHC beam requests during the first years of operation, based on LEP experience. The present performances of the accelerators in terms of available beam brightness, maximum intensity per cycle and repetition rate are used for the analysis. Functional relationships between the beam availabilities for the various users are discussed. Special emphasis is given to operations that imply important beam losses along the accelerator chain and the most relevant consequences are outlined. Finally, potential upgrade wishes of the different users and the most important limitations of the accelerator complex are discussed.

The CNGS facility: status and outlook by K. Elsener

The CNGS facility is under construction and is scheduled to deliver first beam for the $\nu_\mu - \nu_\tau$ oscillation experiment in spring 2006. An overview of the facility will be given and the progress of the works summarized. The expected performance of CNGS ("nominal beam") will be described and the measures decided in 2001 to prepare the facility for higher intensities outlined. Limitations for instantaneous proton beam intensities (per extraction, cf. thermomechanical shocks) and for integrated beam intensities (per year, cf. heating/cooling, radiological issues) will be given. Finally, some comments will be added concerning published proposals on future beams in CNGS (e.g. lower energy neutrinos, off axis beam).

The possible future of the experimental areas (L.Gatignon)

The present layout, capabilities and performance of the CERN fixed target experimental areas are described, including the North and East areas, nTOF, Isolde and AD. The future possibilities will be outlined, taking into account the expected evolution of the accelerator performance. Possible adaptations to new ideas or experiments and their impact on the performance will be discussed.