chambers, and scintillators. Design and development of these systems will be presented.

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WPAH093 Beam Measurement Systems for the CERN Antiproton Decelerator (AD)

VINOD CHOHAN (CERN)

The new, low-energy antiproton physics facility at CERN has been successfully commissioned recently and has been delivering decelerated antiprotons at 100 MeV/c since July, 2000. The AD is a converted facility from the original two-ring antiproton production, collection and accumulation complex decommissioned in 1996.It consists of just one ring where the 3.5 GeV/c antiprotons produced from a production target are injected, rf manipulated, stochastically cooled and decelerated, with further stages involving additional stochastic and electron cooling, rf manipulation and extraction at 100 MeV/c.The inside of the ring houses the experimental area with beam lines for physics. For the decelerator commissioning and setting-up, several beam measurement systems had to be designed, modified and implemented for this new ring. While proton test beams of sufficient intensity could be used for certain procedures in commissioning, this is not possible for normal routine setting-up and operation. Hence, special diagnostics systems had to be developed to obtain the beam and accelerator characteristics using the weak antiproton beams of a few tens of millions of particles at all momenta from 3.5 GeV/c down to 100 MeV/c. These include the position pickup system, beam size measurements using transverse aperture limiters and scintillators, Schottky-based tools and so forth. This paper gives an overall view of all these systems, their usage and evolution.

WPAH094 Beam Diagnostics for Tevatron Electron Lens

Xiaolong Zhang, J. Fitzgerald, M. Olson, V. Shiltsev, N. Solyak (Fermi National Accelerator Laboratory), G. Kuznetsov, A. Sleptsov (Budker Institute of Nuclear Physics)

This report describes the beam diagnostics for the Tevatron Electron Lens(TEL). That includes Beam Position Monitors (BPM) for proton, antiproton and electron beams. Preliminary test results are presented and analyzed.

WPAH095 New Beam Intensity Monitoring System, Serving Extraction from IHEP U-70 Machine

VICTOR TEREKHOV, ALEXANDER AFONIN, VICTOR GRES (INSTITUTE OF HIGH ENERGY PHYSICS, PROTVINO)

In the issue of continuous evolution and upgrading Beam Extraction System at IHEP U-70 Machine Fast, Slow resonant and Slow nonresonant beam extractions can be carried out during the single machine cycle and deliver extracted proton beams ranging from 10^7 to $3x10^{13}$ protons per pulse. The time structure of the beams is variable from hundreds of ns at Fast Extraction to 1.5 s at Slow ones. That requires more challenges for Beam Intensity Monitoring System (BIMS). This presentation describes the main features of the new BIMS. Emphasis is put on calibration aspects.

WPAH096 Proton Driver Beam Instrumentation

VICTOR TEREKHOV (INSTITUTE OF HIGH ENERGY PHYSICS, PROTVINO), JIM CRISP, ROBERT C. WEBBER (FERMI NATIONAL ACCELERATOR LABORATORY)

The multipurpose Fermilab Proton Driver is designed to provide short proton bunches at intensity $3x10^{13}$ protons and at 15 Hz repetition rate. This presentation describes Beam Instrumentation foreseen both for the PD ring and its adjacent beamlines. The basic requirements and specifications of all beam instruments are given. Emphasis is put on the Beam Position and Beam Loss Monitoring systems. Conception of the accident preventation issues is studied as well.

WPAH097 Experience with the Low Energy Demonstration Accelerator (LEDA) Halo Experiment Beam Instrumentation

J. GILPATRICK, D. BARR, P. COLESTOCK, L. DAY, W. SELLYEY, R. B. SHURTER, M. STETTLER, R. VALDIVIEZ (LOS ALAMOS NATIONAL LABORATORY), J. KAMPERSCHROER (GENERAL ATOMICS), M. GRUCHALLA, J. O'HARA (HONEYWELL CORPORATION)

A 52 quadrupole-magnet FODO lattice has been assembled and operated at the Los Alamos National Laboratory. The purpose of this lattice is to measure the halo resulting from a space charge dominated beam transporting through a lattice under various mismatched conditions. These data are then compared with particle simulations so that halo formation mechanisms may be better understood. The lattice is appended to the LEDA 6.7-MeV radio frequency quadrupole (RFQ) and is followed by a short high-energy beam transport (HEBT) that safely dumps the beam into a 670-kW beam stop. Beam diagnostic instruments are interspersed within the lattice and HEBT. The primary instrument for measuring the beam halo are nine interceptive devices that acquire the beam's horizontal and vertical projected particle density distributions out to greater than 100000:1 dynamic range. These distributions are acquired using both traditional wire scanners and water-cooled graphite scraping devices. The lattice and HEBT instrumentation set also includes 15 position, 15 bunched-beam current, 6 pulsed current, and 7 beam loss measurements. This paper briefly describes and details the operation of each instrument, compares measured data from the different types of instruments, and refers to other detailed papers.

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WPAH098 Beam Profile Wire-Scanner/Halo-Scraper Sensor Analog Interface Electronics

MICHAEL GRUCHALLA, DEAN S. BARR, LISA A. DAY, J. DOUGLAS GILPATRICK, MATTHEW W. STETTLER (LOS ALAMOS NATIONAL LABORATORY), DERWIN G. MARTINEZ (GENERAL ATOMICS), JAMES F. O'HARA (HONEYWELL FM&T/NM)

The halo experiment presently being conducted at the Low Energy Demonstration Accelerator at Los Alamos National Laboratory utilizes a generally traditional wire scanner for measurement of the beam core profile and a graphite scraper for measurement of the tails of the beam distribution. Both sensors are integrated into a single novel Wire-Scanner/Halo-Scraper instrument. The charge of secondary electrons emitted from the wire and the charge of the protons collected in the scraper are detected with a low-noise analog electronic interface. A lossy integrator is used to detect the replacement charge flowing to the wire and scraper. Independent programmable DC-bias voltages are applied to the wire and the scraper through the analog electronic interface to optimize charge capture from the two sensors. Ceramic breaks isolate the scraper from the water supply, and a programmable guard voltage isolates the scraper from the ceramic breaks. The output signal magnitude is digitized with a 14-bit plus sign analog-to-digital converter. Programmable gain provides a total dynamic range in the analog electronics of greater than about one part in 10^7. This paper describes the analog interface electronics designed for sensing the charge signal from the Wire-Scanner/Halo Scraper sensors.

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WPAH099 Several New Beam Measurement Systems for HLS

BAOGEN SUN, DUOHUI HE, JIANHONG LIU, PING LU, JUNHUA WANG (NATIONAL SYNCHROTRON RADIATION LAB)

This paper describes several new beam instruments for Heifei light source (HLS). These new beam instruments include a tune measurement system to measure the beam tune and chromaticity, a DCCT