Drift Chamber Monitoring and Upkeep

May 10, 1994

Introduction

This document summarizes the information needed to monitor and keep the MPS drift chambers working properly during shifts for the 1994 run.

The MPS drift chambers are located inside the magnet, downstream of the target. For the 1994 run there are six drift chambers installed. Each chamber has 3 x planes (offset), one y plane, one u plane, one v plane and another y plane. The drift chamber readout is located in the fast trailer.

Hardware

Gas System

The gas system should require little maintenance besides monitoring the gas system alarms. See the notes by L. Hawkins for how to handle alarms.

High Voltage

The drift chamber high voltage is interlocked and tied into the alarm panels in the control room and fast trailer. In case of a high voltage trip, the high voltage supplies are in the bottom part of Rack 3 in the fast trailer. The voltage readout must be done on the meter panel in the middle of the rack. The HV and HV Trip switches should both be turned off on the tripped supplies (the red indicator light will be off). The voltage should be turned down to 0 and the switches turned back on. Both halves should be turned on together and brought up to the listed voltages.

General Maintenance

For the most part, there is very little that can be done to fix an MPS drift chamber by the experimenter. Breakdowns MUST be clearly noted in the logbook so the MPS crew can make repairs. If the failure is critical, the MPS crew member on call should be notified.

Software

drift Program

The main way of monitoring the drift chamber performance is though the use of the program *drift* . It is in the e852/bin directory and availible from the Desktop through start.session. Upon startup *drift* should be connected to the on-line Dispatcher (mpsdaq:10098).

It should begin collecting data immediately. Each of the 6 drift chambers should be checked and each plane monitored. This is done by clicking on the button next to the labeled plane.

The user should check for several things when monitoring the drift chambers. The plot on the right should be checked out to see if it has the right shape (see Figure 1b). It should have a rounded humped centered in the middle which tails off to the right. The left hand side can contain junk in the first 7-9 channels if there are hot wires. The plot can be scaled up or down using the middle and right mouse buttons. If the time distribution does not have the hump in the middle (starting around t of about 12-18 ticks), it is possible the drift chamber clock stop is timed wrong. This should be adjusted only by experts and changes clearly noted in the logbook.

The left plot should be used for noting hot wires. It is the "wire map". There should be a bump somewhere in the middle which is where the beam comes through. There may be other places where one of more wires has more hits in it then the beam. These wires are hot and should be noted for repair. They are generally not worth calling in the MPS crew for a few hot wires. The horizontal axis can be expanded or shrunk with the middle and right mouse button. By placed the cursor near the hot wire, there region can be expanded with the middle button. Then the cursor can be placed on the offending channel and clicked with the left button. The wire number will appear at the top of the plot as the x position. The right button will shrink the plot and other wires can be checked. Often these hot wires will appear in groups of 4 since four wires go into each chip.

A hot wire list can be automatically produced by *drift.* Under Options a Fraction for Hot Wire should be selected. This will be depend on the type and amount of data collected. A recommended value is 50%. Then under Action a Hot Wire Scan (fraction) should be done. You can print this list. It should be checked to see if the user agrees with the hot wires which were found.

event Program

Another simplier way which should be used on a continuous basis throughout the shift to monitor the drift chambers is to use the *event* program. It displays events as they come in. Charged events should be checked with event to make sure that each chamber is recieving hits. This technique will probably only tell if the chamber has been completely lost, however that is very important. The user should check the x-z, y-z and x-y plots to see that hits register in all planes.

Shift Responsibility

The people on shift have several responsibilities for the MPS drift chambers. Several times a shift each wire map should be checked for abnormalities. Hot wires should be noted it there are a large number. Mostly this scan is to check for dead or noisy planes or chambers.

Each day the night shift (midnight to 8am) should list the hot wires and print out all histograms for the MPS crew to use if they have the opportunity to fix the chambers.