

VDET Good Event Selection with XVDEOK

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This note describes the function XVDEOK which should be used to check the state of the data for each event before using that event for physics analysis involving the vertex detector. XVDEOK is a logical function returning true if the VDET is on, and false if it is off. It is installed as part of ALPHA. It should be noted that it requires the presence of the VFHL bank on the input data set. The remainder of the note describes how the on/off state is determined from the data.

In principle the state of the VDET should be reflected by the state of the high voltage bit recorded with each event. Unfortunately this was not reliable for data in the early part of the 1991 running period. For this reason another method was devised to check on the state of the detector. It makes use of the fact that with the high voltage off the detector is very noisy and generates many spurious "hits". The number of noise hits in the VDET in its running state is on the order of twenty, and the total number of clusters for a good multihadron event rarely exceeds a few hundred. The additional noise produced when the high voltage is off may add up to several thousand clusters. So, as an indicator of the state of the detector, the total number of clusters, as recorded in the VFHL bank, is used.

In figure the number of hits is shown plotted against the event number. The plot uses data from the early part of the 1991 running period. For low event numbers, ie. at the beginning of a run when the voltage is not yet up, the number of hits per event is huge, and that for later event numbers when the detector is fully on, the number of hits is small. It should be noted that there are also many events close to the beginning of a run that do in fact have small numbers of hits, these come from runs in the middle of a fill where the detector is already on at run start. Conversely there are also some cases where the event number is large and the number of coordinates is also large, this may occur where the VDET had been switched on some part way through a run.

The effect of the routine is summarized as follows:

- Before Run 12089, when the HV bit was not reliable, the number of clusters in the detector is required to be less than 500.

The fraction of events rejected by the routine 0.5%

- After Run 12089 the HV bit is used, as recorded in the EVEH bank. After this run, in addition to the HV bit becoming more reliable, the readout system was so configured that there would be no data read out if the bit were not on. The number of events with more than 500 hits, is negligible.

The routine rejects less than 0.4% of hadronic events, in addition to those rejected by an XLUMOK cut.

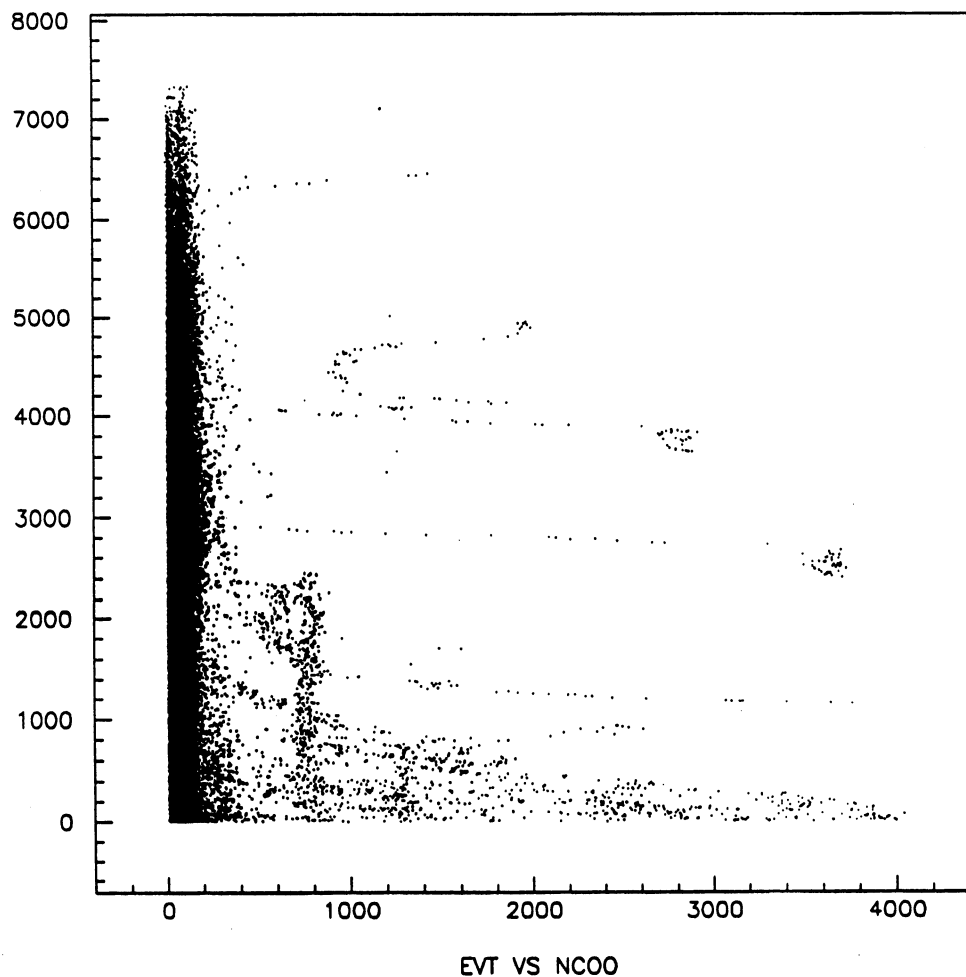


Figure 1: Event number plotted versus number of clusters in the detector for data from the early part of the 1991 running period. Events with very large numbers of hits ie. detector off, are usually clustered around the low event numbers. Most events have less than 500 hits.