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* A Manual of SPS Event Display Program EVPLT

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I developed a program to display a muon event and a fitted muon trajectory of the SPS data on the graphic screen. It also be able to make a hardcopy of the plot. This is a short note how the program works and how it can be used. The program is called EVPLT after "EVent PLoT". It is capable to;

1) plot all OM and CM hits on a graphic display
2) use different marks to distinguish light intensity logarithmically
3) display run number, block number, event number and time
4) plot fitted Cerenkov light arrival time
5) display fitting parameters
6) change fitting conditions
7) make a hardcopy of the display.

i) the program

This program uses unified graphics system (UGS) subroutines[1] to display things on the screen. To use the EVPLT, you do need a graphic terminal. I assumed that the graphic terminal to be used is Tektronics 4010 terminal or compatible. All the graphic terminals HEPG has in room 217 are compatible to the 4010 terminal. So you generally need not worry about the terminal as far as it is a graphic terminal. I usually use EVPLT with my PC running a Tektronics terminal emulation program which come with Kermit. The EVPLT works fine with this combination.

It also uses the same UGS subroutines to make a hardcopy from the laser printer, though you cannot get them interactively. All this program does for the hardcopy is to generate a graphic data file in your default area. To get actual hardcopies, you have to print them out using the print command with an option "/que=talaris ".

To obtain data to be plotted on the screen, the EVPLT uses the UNPACK subroutine I developed before. This routine can read more than one data format. We are now using four different data format for the muon data of the SPS experiment. One is the raw SPS data format, the second one is the SPS synchronized raw data format, the third is Med-Vic compact data format, and the other is Vic's MC data format. The UNPACK routine can handle first three data format without any problem, though it handle three format a little different way.

As you may know, the UNPACK routine overrode the default directory of the data file a weird way (reasonable way to me but ...). If the file name begins

with "SPS", the program assumes that this file is in the directory "TEMP:[bradner]" where we keep the raw data. If you want to use file begins the same way, you have to specify the directory name, regardless it is default directory or not. It also assumes that the file whose name begins with "MU" is the file with Med-Vic compact data format. In this case the UNPACK does not override default directory.

ii) how to use

To run the EVPLT, key in "r [shige.sps]evplt". Be careful not to use "CAP LOCK" on the terminal, because the program assumes that the response will be made with lower case characters.

The first thing the program will ask you is "Key in Qefact.". This is a multiplicative factor applied to the error of light intensity, so that the effect of the intensity can be suppressed relative to the timing when muon trajectory fitting is performed. I usually used 1.25 for this value so that the effect of intensity to the fitting is 1/1.5.

The next thing the program will ask you is whether you want to to print out the data plot and the fitting result on the separate paper or not. Answer "y" if you want. Other input or <cr> will be regarded as "n". Usually you don't want this feature. But the separate plot is very useful for the presentation with the OHP transparencies.

The last thing the program will ask is the name of the data file you want to plot on the screen. Key in whatever file name you want. But be careful about the default directory name, I described above.

Now the EVPLT enters into the event plotting loop, and you will get the first event plotted on the screen along with the command prompt.
The program can accept 5 commands right now. These are listed below.

"c" -- change fitting condition. mask a hit or change angular correction.
"h" -- make a hardcopy of this event displayed on the screen.
"n" -- quit the EVPLT program.
"p" -- change plot to the θ vs χ^2/d.f. plot or to the normal event plot.
<cr> - plot next event.

If you select a command other than <cr>, then the program will perform the command on the event you got on the screen. Some command have effect to further event. But you will get the same command prompt as before and have to key in <cr> to go to the next event.

Figure shows a sample of the EVPLT's hardcopy output of the real SPS experiment data at 4000 m depth. In this figure, Event ID is "Run # - Block # - event # in this block". And time is measured from the beginning of the data file. Six different mark are used to distinguish light intensity at each detectors. A dot is the least and represent light intensity of less than 0.8 photoelectrons (PE). A black square is the most intense mark and represents more than 12.8 PE. The

other marks used in the plot are +, ×, ✳, and × with small diamond. Each mark represents a factor of two photoelectron range with this order.

iii) how to change the program

The main part of the program is in the area "[shige.sps]evplt.for". If you want to change something in this program, please do so after copying the program to your area. It uses a lot of subroutines in the "[shige.sps]unpack.for", "[shige.sps1]spfsub.for", and "[shige.sps1]spfplt.for". It also need the object library of the UGS system at the time to link the program. The link command file is in the area "[shige.sps]evplt.com". So the procedure to make a executable program file is as follows. Change the source program, compile it, and key in "@[shige.sps]evplt"

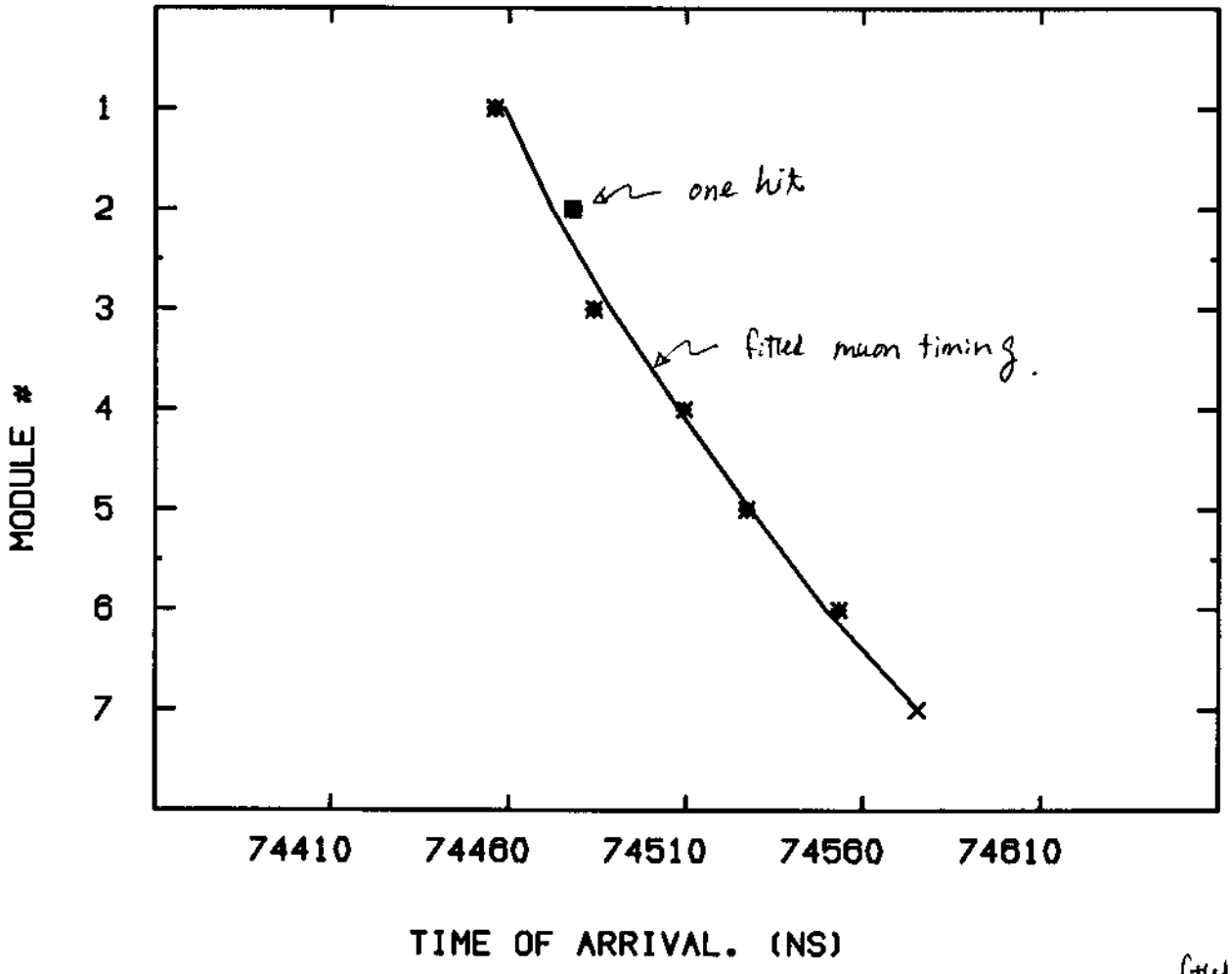
reference

1) R.C. Beach , "The Unified Graphics System for FORTRAN 77", preprint SLAC-CGTM 203, Nov. '85

Run # - Block # - Ev # in a block

SPS DATA PLOT. EV. ID : 1238- 315- 4 ANG.SEN.CORR.-OFF

TIME (S) ; 259.30



FIT PARAMETERS.

Z = 5.5

B = 5.3

THETE = 27.7

COS(TH) = 0.89

T0 = 20.

CHI/DF = 1.02