



TTR Event Display User's Guide

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Abstract:

The event display is an X-windows/Motif application (therefore it can be used only on UNIX workstations or X terminals) that graphically shows the hits and tracks of cosmic muon events taking place at the TTR, see Figure 1. It is designed to work both on-line and off-line. The event display application consists of various resizable windows; upon start, only the main window is managed, this window depicts the main components of the TTR, i.e., scintillation counters, Iarocci planes, muon technologies under test, magnet, muon hits and tracks fitted to different sets of hits. The main window is divided in two parts: in the upper part is the control area, and in the central and lower part is the drawing area. The control area contains a number of pull-down menus and buttons that control the behavior of what is displayed in the drawing area; the latter displays the Y-Z projection of the TTR on the left side, the X-Z projection at the center and a message area on the right side.

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1. Description.

The event display is an X-windows/Motif application (therefore it can be used only on UNIX workstations or X terminals) that graphically shows the hits and tracks of cosmic muon events taking place at the TTR, see Figure 1. It is designed to work both on-line and off-line. The event display application consists of various resizable windows; upon start, only the main window is managed, this window depicts the main components of the TTR, i.e., scintillation counters, Iarocci planes, muon technologies under test, magnet, muon hits and tracks fitted to different sets of hits. The main window is divided in two parts: in the upper part is the control area, and in the central and lower part is the drawing area. The control area contains a number of pull-down menus and buttons that control the behaviour of what is displayed in the drawing area; the latter displays the Y-Z projection of the TTR on the left side, the X-Z projection at the center and a message area on the right side.

Control Area.

On the upper left corner of the control area are four pulldown menus in a row, they show their corresponding menu upon clicking on them with the left side button of the mouse; these pull-down menus are:

* **File.** It includes an **Open** and a **Quit** buttons.

The **Open** button calls a File Selection Widget used to select the file containing the data to be displayed. This button is necessary only when the event display application is used in **OFF LINE** mode.

The **Quit** button is used to exit the application.

* **Technologies.** It displays a menu containing the names of the technologies under test at the TTR. When the name of one of these technologies is clicked, the window corresponding to that technology is opened, see Figure 2. There is no limit on the number of technology windows that can be opened but each technology can have only one window opened, i.e., no ghost windows are allowed.

* **Set Event.** This menu displays an **Enter Event** button that prompts for the event number to be typed. It is useful in conjunction with the **Fit** button to select a particular event.

* **Fit.** Displays the **Do Fit** button which causes the present event to be re-displayed. It is useful to display the same event with tracks fitted to different sets of hits, as explained below.

Below the pulldown menu bar there are a **Left Arrow**, a **Right Arrow** and a number of toggle buttons.

Left Arrow. When clicked it causes the previous event to be displayed. It only works in **OFF LINE** mode.

Right Arrow. When clicked in **OFF LINE** mode it causes the next event to be displayed. When clicked in **ON LINE** mode it causes the last event in the buffer used for inter-process communication to be displayed, generally the event number will differ by more than one with respect to the last event displayed.

Hits and Tracks.

The hits in the main window and in the technologies windows that are open are always displayed. The track displayed in the main window depends on the status of the following toggle buttons. These buttons are switched on and off by clicking on them with the left button of the mouse.

SCintallators Toggle Button. If it is on (white), the track displayed uses the hits in the scintillation counters as part of the fit. When it is off (black), the track displayed (if any) is independent of the hits in the scintillation counters. The default state of this toggle button is off.

IAROcci Toggle Button. If it is on (white), the track displayed uses the hits in the Iarocci planes as part of the fit. When it is off (black), the track displayed (if any) is independent of the hits in the Iarocci chambers. The default state of this toggle button is off. For instance, if both the **SC** and the **IARO** toggle buttons are on, the track displayed in the main window uses both scintillator and Iarocci hits.

LSDT Toggle Button. If it is on (white) the track in the LSDT window is shown; this track is the result of the fit using exclusively LSDT hits. The default state of this toggle button is off. When the **LSDT** toggle is on and the **SC** and **IARO** toggle buttons are both off, then the track in the main window is the result of the fit using only LSDT hits.

The toggle buttons for the other technologies work in a similar way as the LSDT toggle button.

TRACK Toggle Button. When it is on, the track in the main window is displayed, otherwise only the hits are displayed; its default state is on. This toggle button, in combination with the **Fit** button, are handy in quickly removing tracks.

CLEAR Toggle Button. When it is on, the hits and tracks in the main window are cleared every time a new event is displayed; its default state is on. This control is useful to accumulate hits and tracks for several events. It may, for instance, be used to detect dead channels in the TTR component detectors.

ON LINE Toggle Button. When it is on, the event display application can be used on line; its default state is off. In order for the event display application to work on line, it needs to be running the workstation called stone, i.e., the same workstation that runs the DAQ process.

CONTINUOUS Toggle Button and TIME scale. This toggle button is located on the upper right corner of the main window. When it is clicked on, the event display locks in a continuous display mode, showing events at regular intervals controlled by the **TIME** scale that is located below it. The interval used is rounded to the nearest integer. While the event display is in continuous mode, the cursor changes to a small clock, and the only way to interrupt the continuous mode is by clicking again the **CONTINUOUS** toggle button.

Drawing Area.

It is divided in three parts: on the left side is the Y-Z projection of the TTR, at the center the X-Z projection, and on the right side there is a message area. The present date and time appear on top of the message area, below them, are the run number, the event number and the date and time when the event being displayed was acquired. The space left in the message area is used to print out relevant messages related to the event.

2. How to start it.

The event display application can be used from any Sun SPARCStation that has the TTR /daq1 disk automounted, like STONE, STAKE, or STEAM in the TTR Computer Room. Once you are logged into one of these workstations you need to make sure that the environment variable DISPLAY is set properly; for instance if you are logged into your Sun workstation called your_ws and you want to use the event display from stone, you need to do the following:

```
your_ws% xhost +
your_ws% rlogin stone -l ttrdaq
password: [ask a TTR colleague]
login messages appear here
ttrdaq_stone [51] setenv DISPLAY your_ws:0.0
ttrdaq_stone [52] cd /daq1/ttr/ttr2d
ttrdaq_stone [53] ttr
```

when the TTR event display window appears you can use the **Open** button in the **File** menu to select the data file that you want to look at in **OFF LINE** mode. In order to use the event display in **ON LINE** mode you need to run it on stone simultaneously with the DAQ process.

3. How it works.

The TTR event display application is written in C using the Motif widget set as well as X and Xt routines. The application is also linked with a set of Fortran 77 subroutines that George Yost wrote and that are used also for the general offline analysis of the TTR data. The part of the application that uses Motif was written using the TeleUSE builder. The TeleUSE code uses a file called ttr_ui.pcd that contains the static part of the application. This file can be modified by typing vip& in the /daq1/ttr/ttr2d on steam or any other machine that has the disk poobah automounted. The connection between the TeleUSE file and the set of C language routines is done in TeleUSE by means of the files ttr_ui.d and uxb.conf as explained in the TeleUSE manuals. The C language files that contain the routines that handle the event display are ttrc.c, interrupt.c, lsdt.c, pdtusa.c, pdtrsa.c, etc. The TeleUSE command used to create the application is

```
uxb -static -applib libttr.a -applib libttr2d.a -applib
/ssclib/cern/v92a/lib/libgenlib.a -applib
/ssclib/cern/v92a/lib/libpacklib.a -applib
/usr3/lang/SC1.0/libF77.a -applib /usr3/lang/SC1.0/libm.a -applib
/usr3/lang/SC1.0/libC.a -applib /usr/openwin/lib/libX11.a &
```

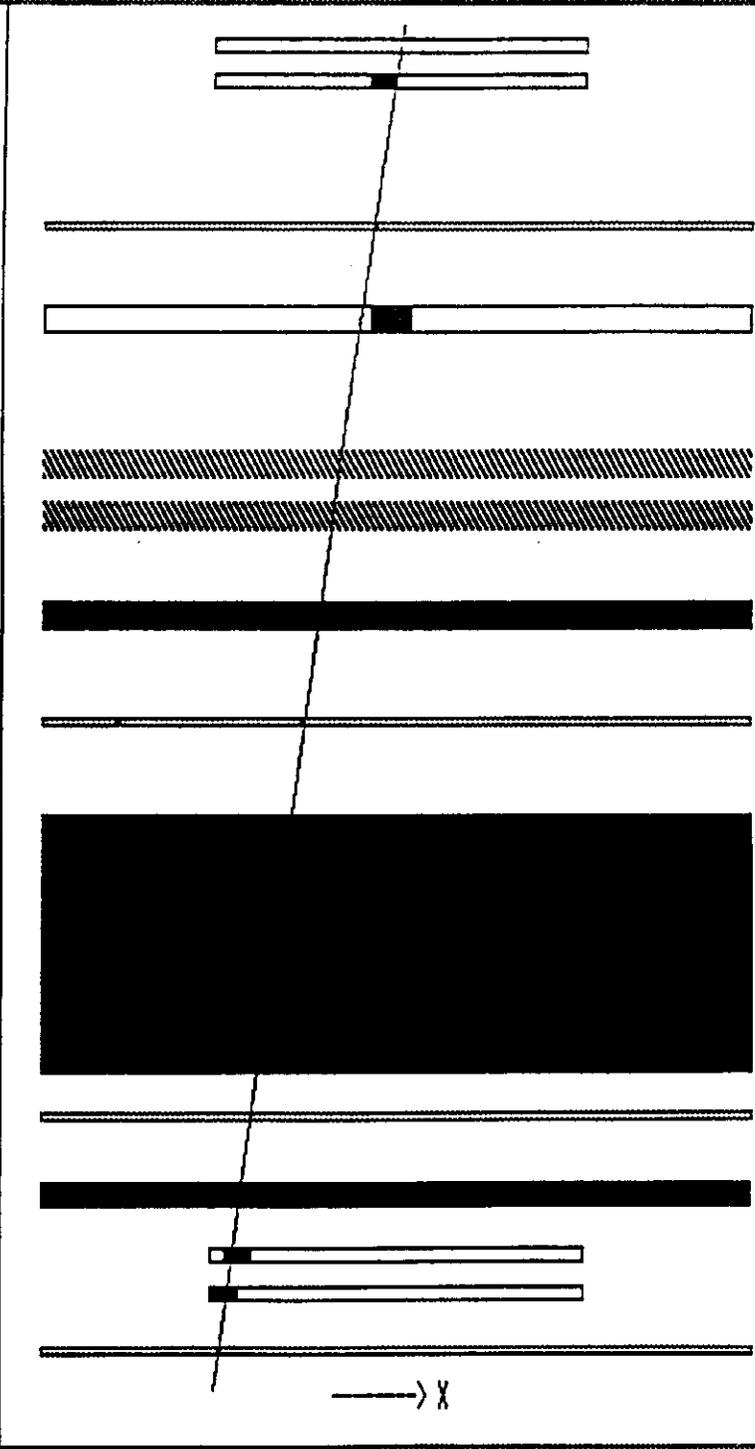
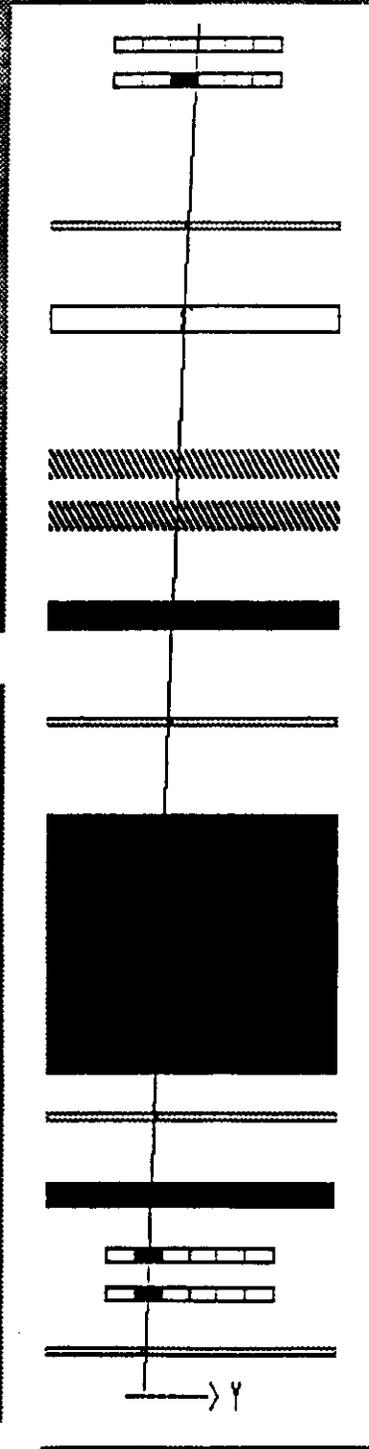
the library libttr2d.a contains C language routines required by the ON LINE mode of operation of the event display. The Fortran library libttr.a contains the following files as of November 20, 1992:

```
ttr.o bfld.o conlv.o fit.o hits.o piarocci.o pselect.o rdcilib.o rdfull.o
stline.o ttrerror.o ttrscint.o callkorytov.o analyze.o constant.o
fumili2.o kfit.o kfit.a.o kfitb.o kfitc.o xvst.o devcor.o both.o
dummies.o pdtusinigy.o
```

The event display application is still under development: the display windows for new technologies are being incorporated and an effort to port the application to HP's is underway. However, directory /daq1/ttr/ttr2d contains the most up-to-date version that is trouble-free.

Navigation and control buttons: SC, TAPD, LSOT, CSC, POTR, POTU, RPC, HC, TRACK, CLEAR, ON LINE.

CONTINUOUS
.0
Time (sec)



Wed Nov 18 12:16:21 1992
Run 533
Event 108
Thu Oct 15 17:47:35 1992

Figure 1. Main window of the TTR event display.
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File

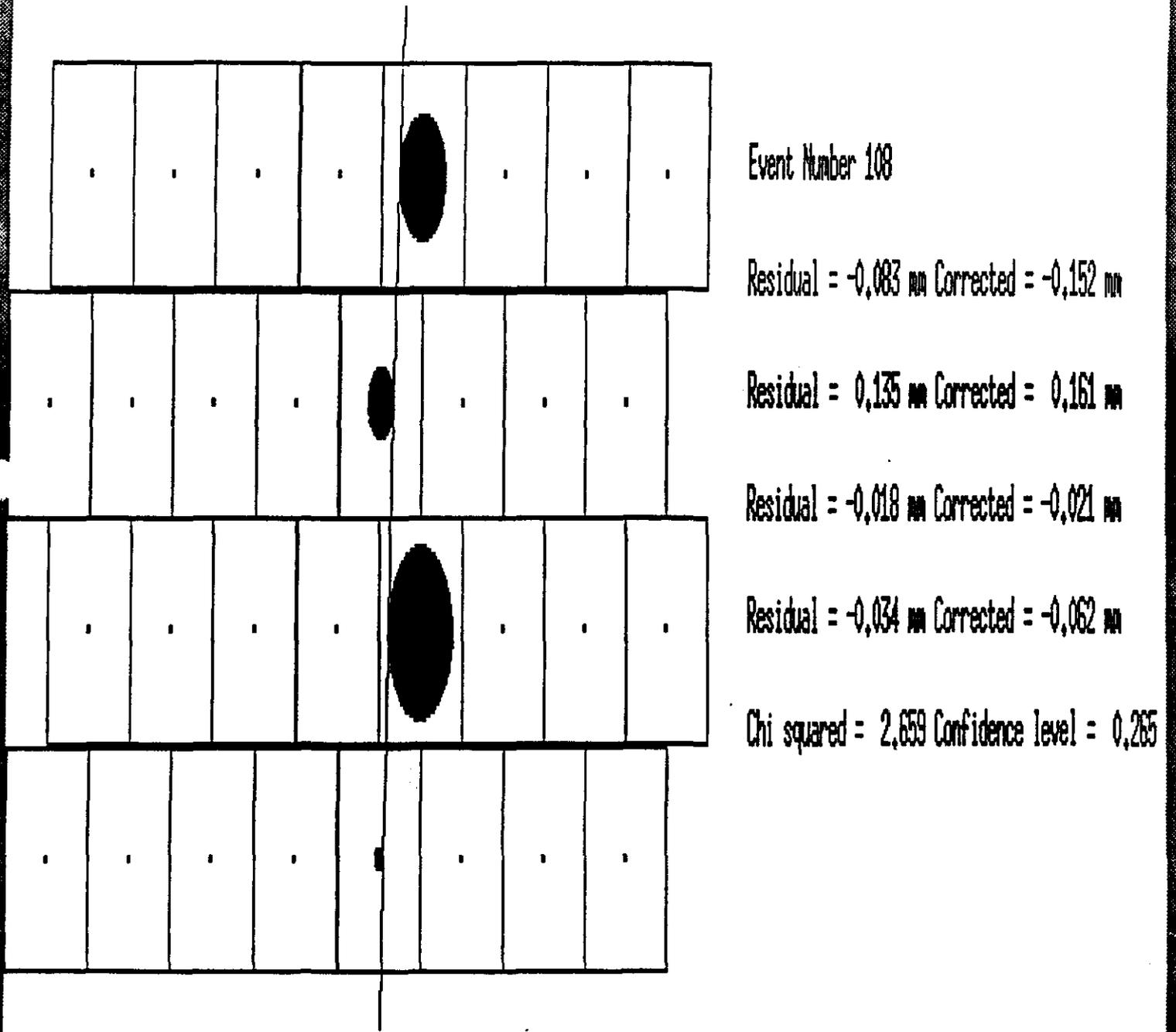


Figure 2. LSDT window of the TTR event display.