

Eve

(The Event Display)

Version: 0.1 (04/28/2008)

Introduction:

The main purpose of the event display (Eve) is to show hits in various detectors of different spectrometers (e.g. E-scintillation plane in BigBite) for every event in a given run. At present, the display has only limited functionality. The current version of the program shows wire hits in the MWDCs and hits in the dE and E scintillation planes.

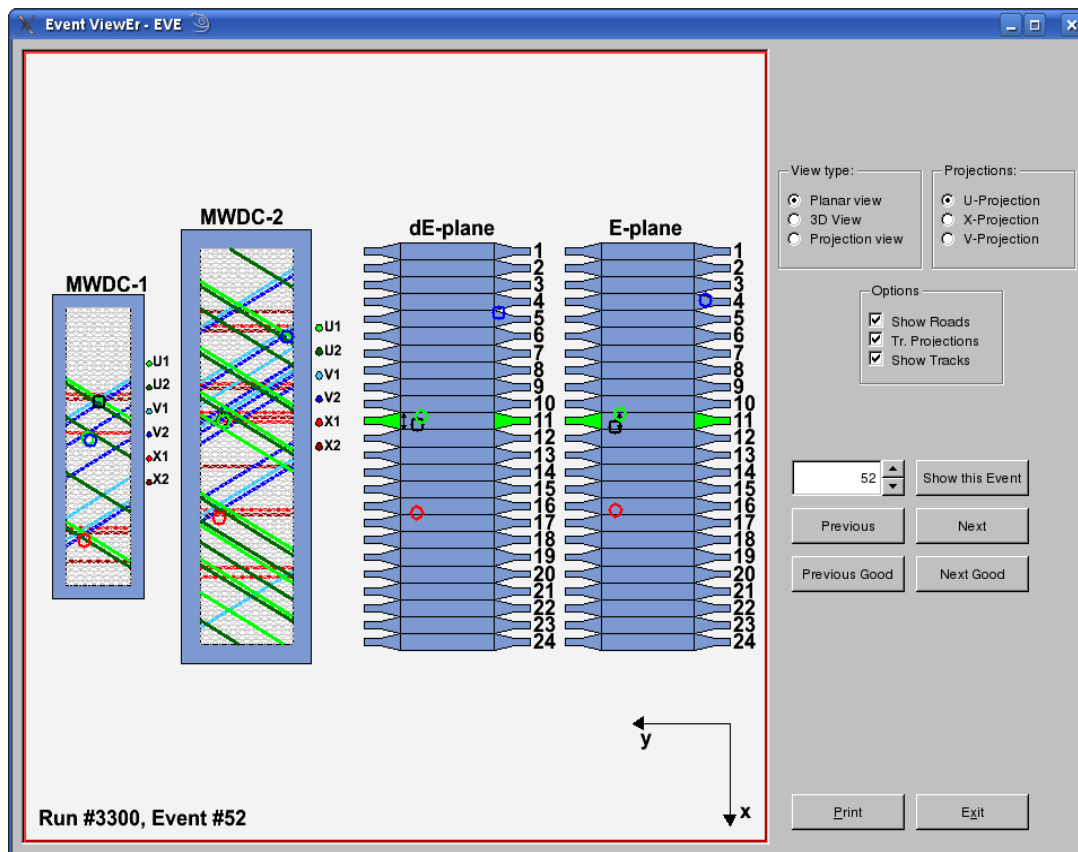


Figure 1: Screen Shot of the event display EVE

Eve supports two dimensional and three dimensional views and draws partial tracks through BigBite detectors. It can be also used to display roads and track projections in different projection views. This feature can be used when debugging the BigBite library.

Installing and using the event display:

You can download the event display source code from <http://www.jlab.org/~miham/>. File *Eve.tgz* contains all files needed. After extracting the package compile the event display by using the “make” command in the directory where you extracted the tarball. In the end you get

a shared library *libEVe.so* which contains all objects needed for displaying hits. To run the event display you can use JLab's analyzer or plain Root. EVe uses replayed root files and not raw data files. Therefore it does not need any additional libraries (e.g. *libBigBite.so*) to work. However, you need to load the *libGeom.so* library before using EVe. After that you can load the EVe's library and start the event display. The tarball *EVe.tgz* already contains a root script *simEVe.C* that you can use. After loading the library you can create a new object that represents the event display. Then you are ready to open a root file and start displaying events:

Example:

```
#include <TGClient.h>
gSystem->Load("libGeom");
gSystem->Load("libEVe.so");
EVe *sim = new Eve(gClient->GetRoot(),400,700); // adjust sizes
sim->initRun(filename);
```

To be able to display hits in both detectors of BigBite, the event display needs all data from them. Therefore you need to run it with *.root files that contain all detector variables. (e.g. e04007_det_xxxx.root), otherwise the display will not work properly or will crash while trying to load the needed data.

Modifying the event display:

The event display EVe is a set of C++ classes which are used to describe particle detectors (e.g. ScintillationPlane.*) or their parts (e.g. Scintillator.*). All of them are then bound together in the main class EVe.cxx. This class reads all necessary data from the root file and sets the variables of detector objects in a way that all hits for a given event are shown on the screen. This class is not universal but depends of the configuration of the detector. The current version of the event display is meant to be used for the Threshold Pi0 experiment (e04007). However, to use EVe for other experimental settings (e.g. GEN), you just need to modify the EVe.cxx class. Other classes do not need to be changed. You must be particularly alert when changing the connection between the root variables (e.g. BB.tr.p) and local variables. If relations between these variables are not set correctly, the event display will not work properly. There is also a database file EVe_DB.dat that contains information about the spectrometer and its detectors (e.g. dimensions, distances, wire numbers). When changing the spectrometer configuration you need to change this file as well.

Open Problems:

There are still some bugs and problems that need to be resolved. The positions of tracks in the detectors seem to be a bit off. We believe that this is mostly because we do not know the exact positions of the detectors with respect to the target. We also encounter some errors when exiting the event display.

We also have some ideas and plans for further improvements. We intend to display full track reconstructions through the spectrometer. Classes for this feature are already prepared, but the optics module in the BigBite library is not yet good enough to be able to draw full tracks

(positions and dimensions problems). We plan to extend the event display to the electron BigBite package (Cerenkov, Shower detector etc.) and to create the event display for the HRS-L and HRS-R spectrometers. We will also implement arbitrary cuts so that the user will not be forced to display all events in the root file but only those satisfying certain conditions.

Miha Mihovilovic (miham@jlab.org)