Harald Vogt
DESY Zeuthen

Event Visualization
(a TESLA Event Display)

Outline:

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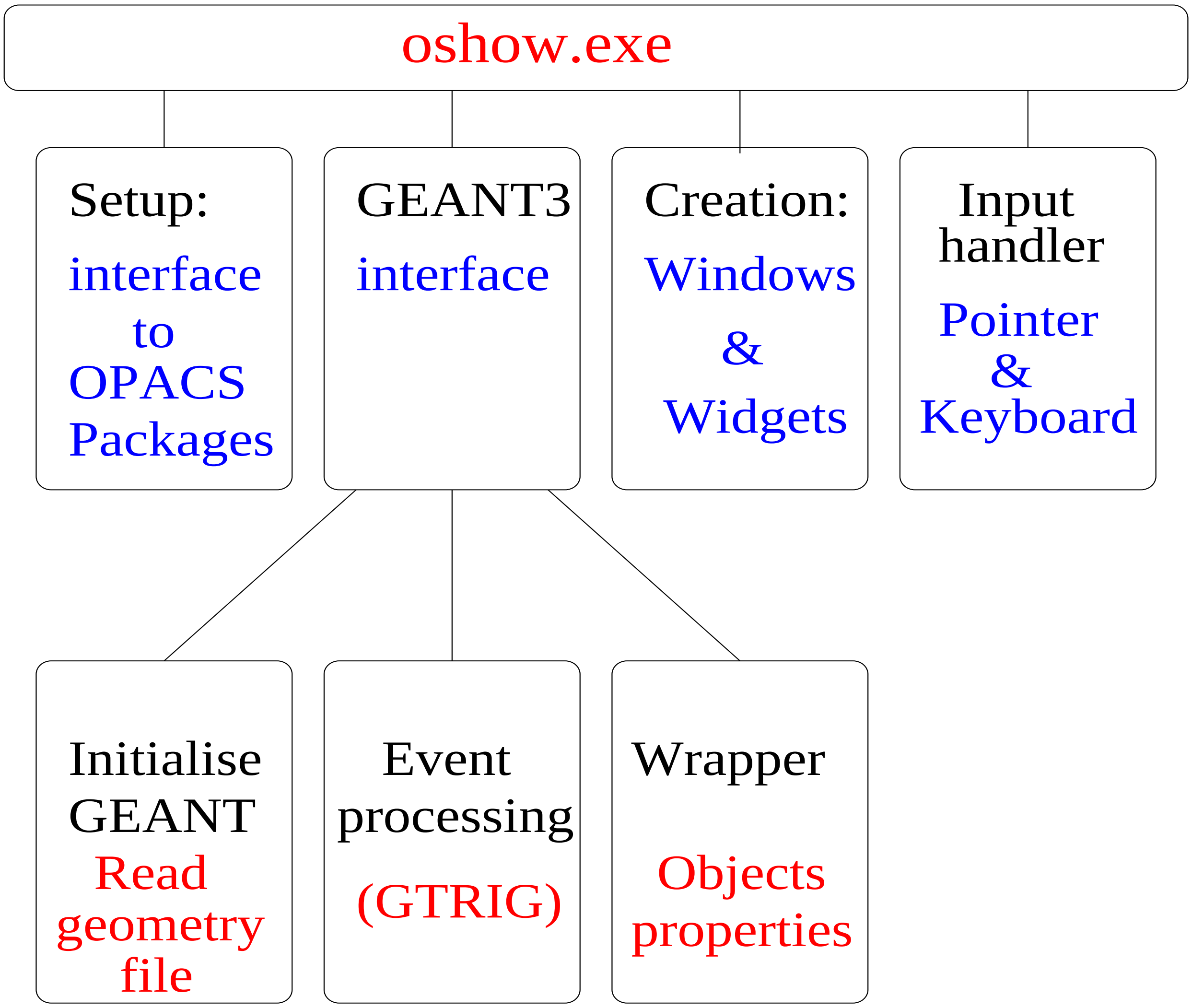
Introduction

- TESLA detector study tools (FORTRAN):
  - BRAHMS a GEANT3 based detector simulation
  - SIMDET a fast Monte Carlo detector simulation (parametrization based on BRAHMS)
- Common output structure (produced by BRAHMS/SIMDET)
  - File header includes:
    - Type of structure (standard or restricted)
    - Detector geometry used (CCD or APS)
  - Standard output (includes generator information)
  - Restricted output (only detector response)
  - Output formats: formatted and binary
- The TESLA event display
  - GEANT3 based FORTRAN interface for
  - the OPACS visualization driver (ANSI C)
  - wired presentation of GEANT volumes

The OPACS Visualization Environment:

- developed by Guy Barrand (LAL Orsay)
- includes a widget manager (using Motif)
- has a command language interpreter (osh - Bourne shell like)
- has a simple 3D viewer
- can be used flexible and provides a good FORTRAN/C interface
- good perfomance on Linux PC's (gcc/g77, lesstif, X11 server)
- rendering can be included using OpenGL/Mesa libraries.

TESLA Event Display Program Structure



Drawing

detector geometry, generated particles, energy flow objects

Drawing of the detector geometry (wired GEANT3 shapes)	- VOLU objects
Drawing of generated particles (charged and neutral tracks)	- MCT objects
Drawing of energy flow objects	- 2 types: charged (TKF objects) neutral (TOWE objects)

Retriving Properties of Displayed Objects

Global event information

$N_{run} = ID_{(ISR)}, \quad N_{event}, \quad E_{CMS}[\mathrm{GeV}], \quad ID_{process}$

Pickable objects properties

VOLU properties - size[cm], position[cm]

MCT properties - ID, p[GeV/c], ϕ[rad], θ[rad], dca[cm], z_0[cm], particle

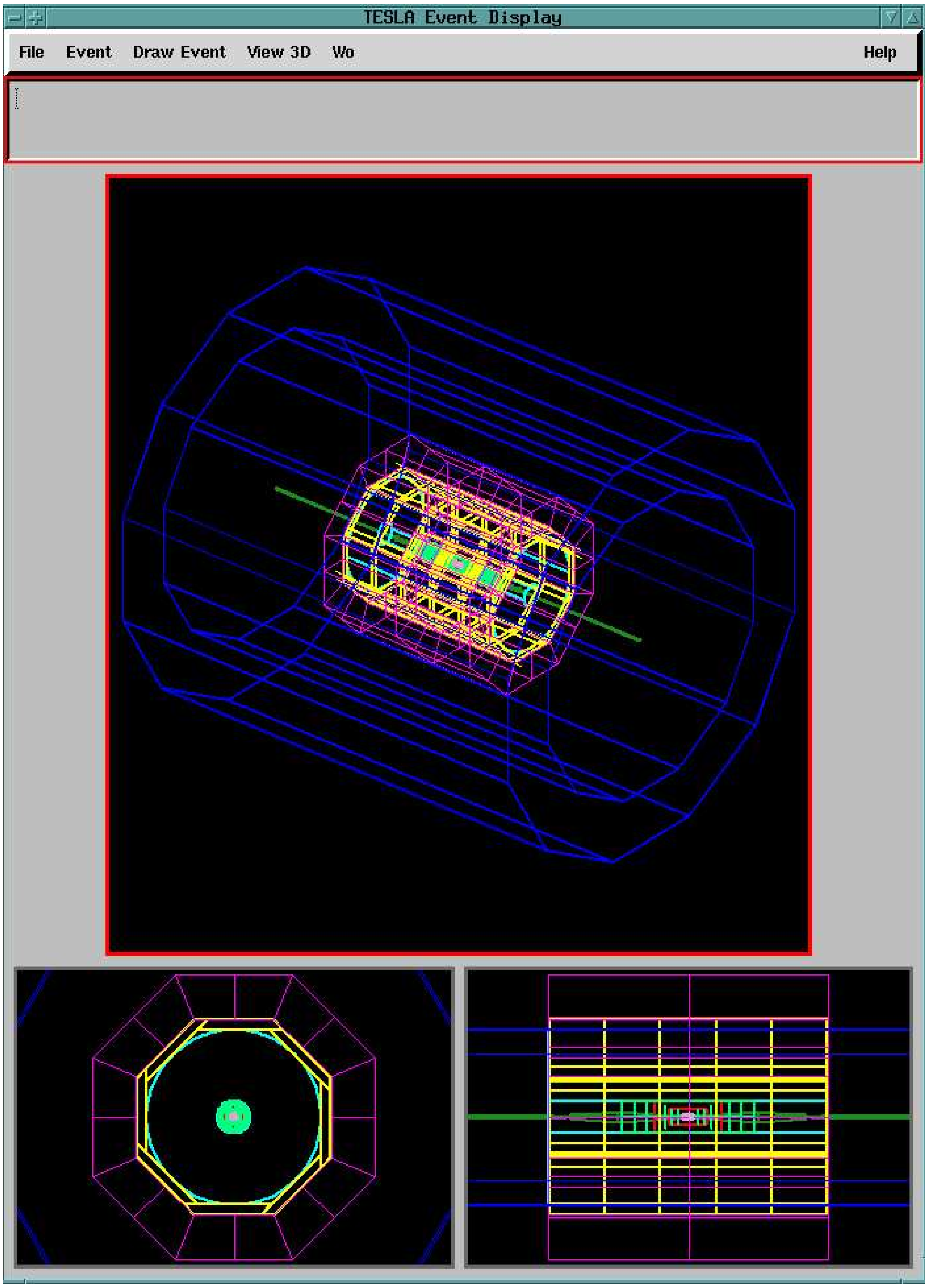
TKF properties - ID, p[GeV/c], ϕ[rad], θ[rad], dca[cm], z_0[cm], mass[GeV]

TOWE properties - ID, x[cm], y[cm], z[cm], E_{tot}[GeV], E_{em}/E_{tot}

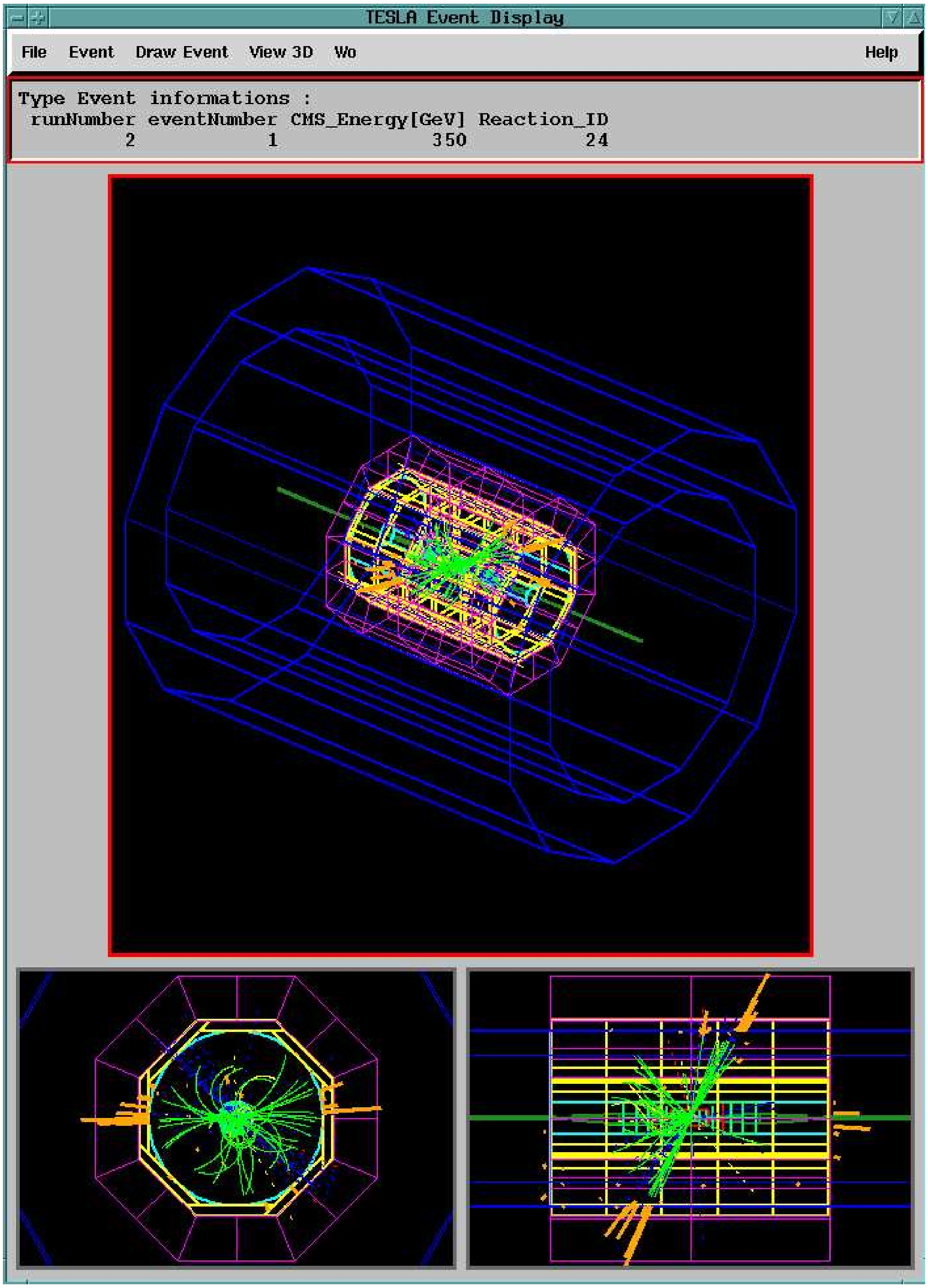
The Event Display

- TESLA detector geometry
- Events generated and detector respose
- Picking up object properties

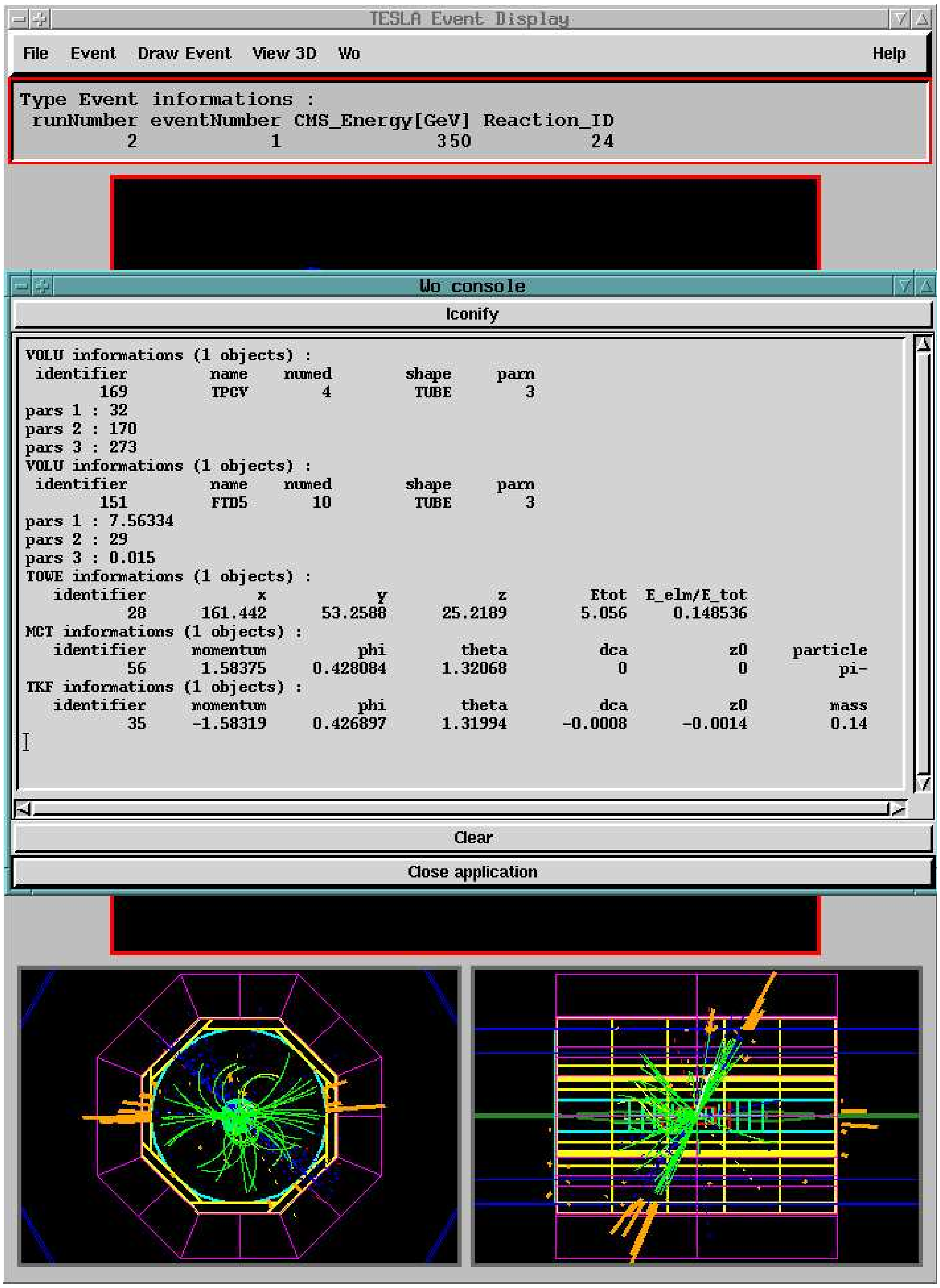
TESLA Detector Geometry



Geometry, generated particles, detector respose

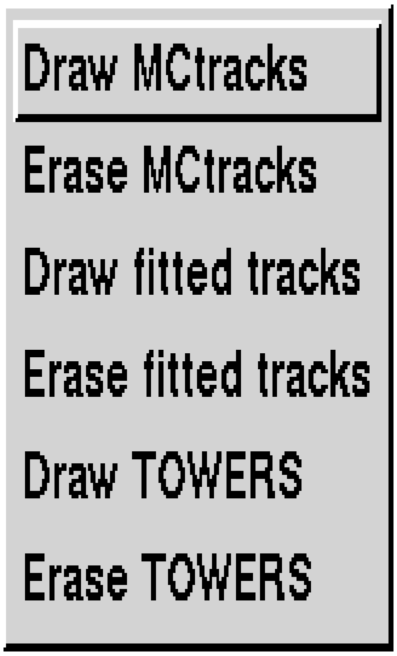


Picking up objects (VOLU, MCT, TKF, TOWE)



Example - The Draw Event Menu

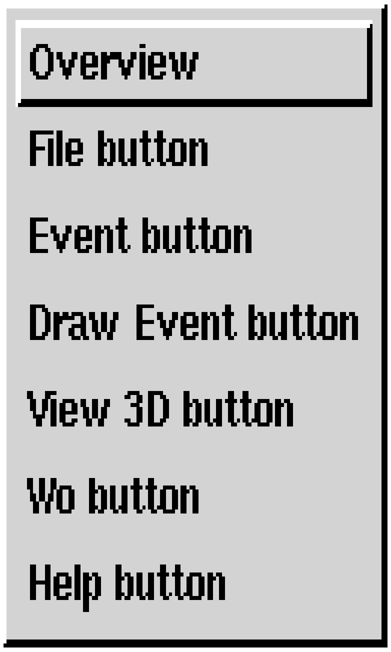
Pushing the Draw Event button
the following pulldown menu comes up:



This enables to switch on/off
the drawing of (MCT, TKF, TOWE) objects.

The Help Facility

Pushing the Help button (right button in the menu bar) the help menu will come up.



The help info is given in HTML and displayed in a lynx browser. Not all but the essential topics are documented.

Summary and Future Developments

- A TESLA event display has been developed for data written by BRAHMS or SIMDET.
- The detector geometry is drawn by a simple wired presentation.
- Three types of event objects have been defined that can be drawn (MCT, TKF, TOWE).
- A help facility is included.
- Widget hierarchies are defined by ascii files.
- OPACS is part of GEANT4 visualization (OPACS driver) $\Rightarrow$ ALICE experiment.
- Textured GEANT shapes can be drawn using OpenGL/Mesa.
- Using JAVA with OPACS is an option (in progress).