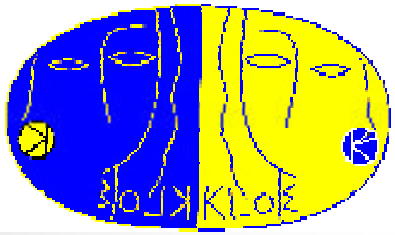
ROOT 2001

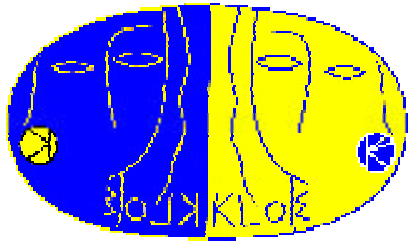


Use of the ROOT framework in the KLOE experiment

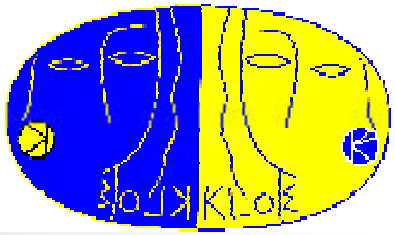
Wen Mei *

For the KLOE Collaboration 1

*Laboratori Nazionali di Frascati dell'INFN, Frascati, Italy.

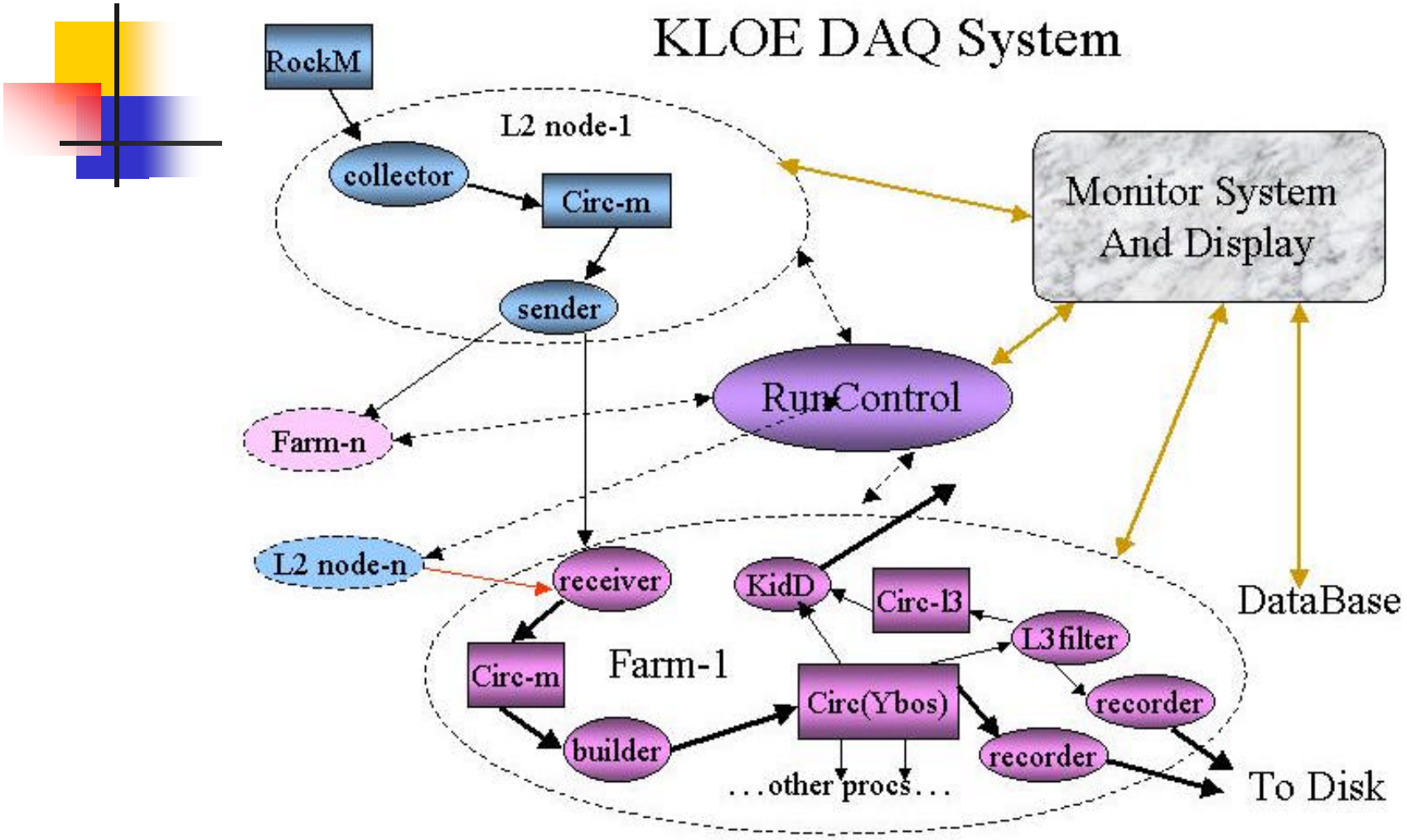


- Histogram Monitoring System
  - Kserver and Kbrowser
- General status presenter
  - KGeneral

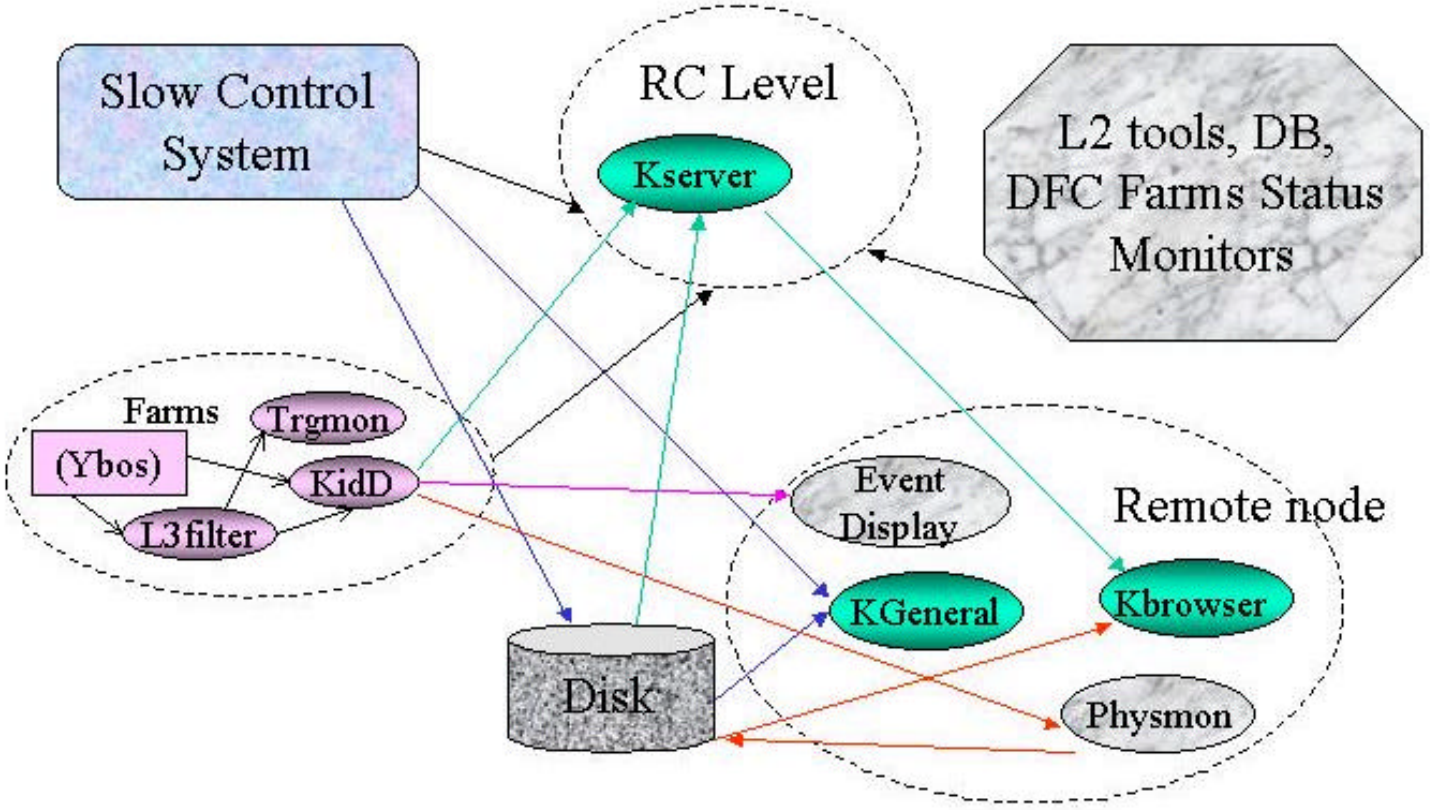


1. KLOE Online Data Acquisition System

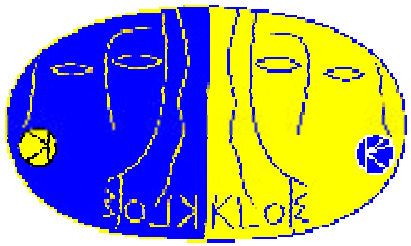
2. KLOE Monitoring System
   1) *Histogram monitoring system*
   2) *General status presenter*
   3) *Other tools*


KLOE DAQ System
RockM
L2 node-1
collector
Circ-m
sender
Monitor System
And Display
RunControl
Farm-n
L2 node-n
receiver
KidD
Circ-l3
L3filter
DataBase
Circ-m
Farm-1
Circ(Ybos)
recorder
builder
recorder
...other procs...
To Disk

KLOE Monitoring System

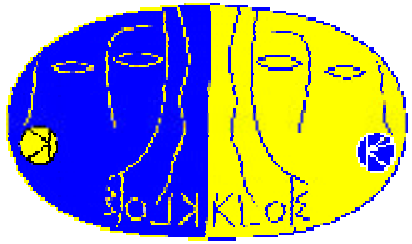


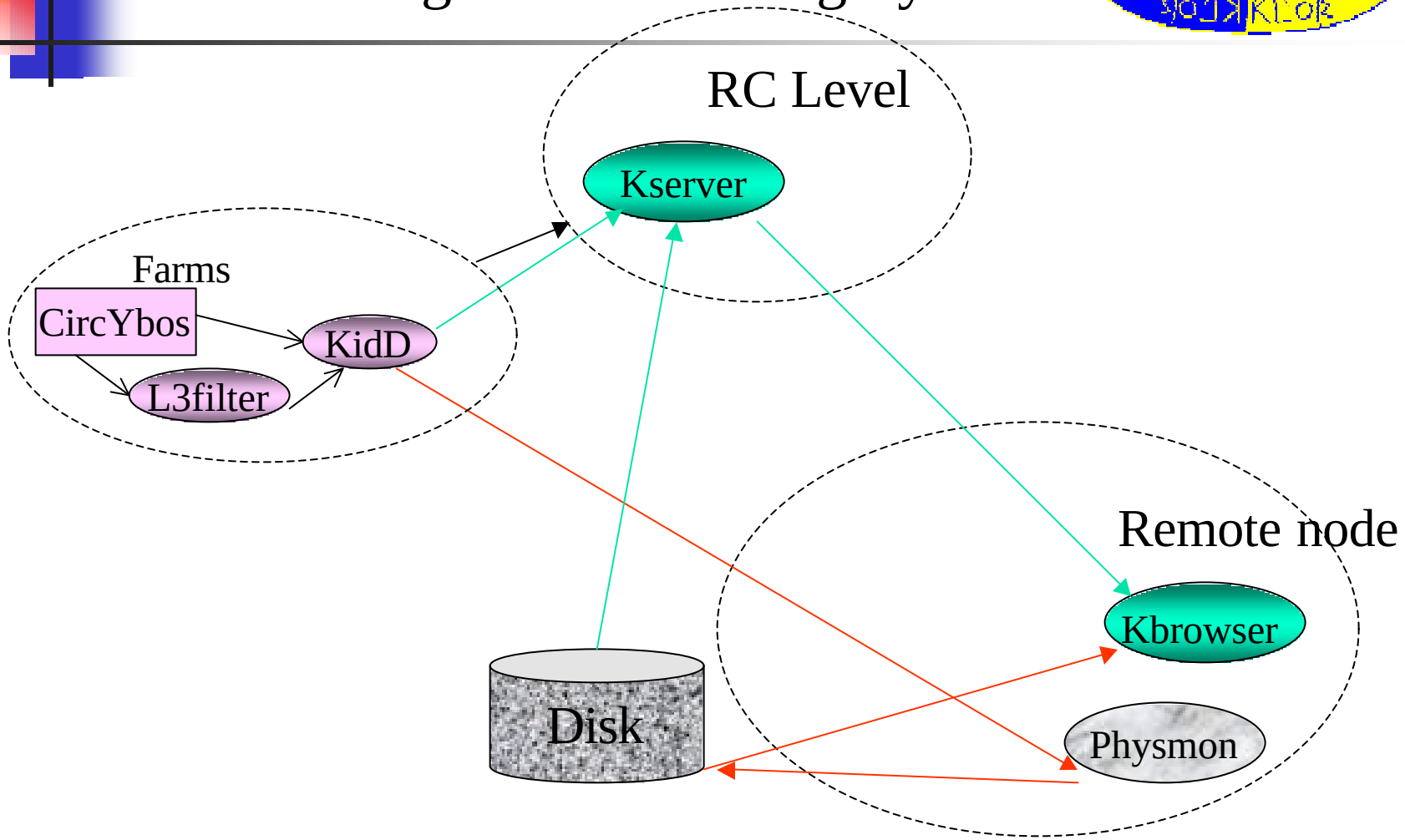
3. Histogram Monitoring System



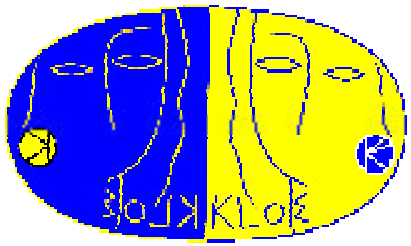
- Client_server system Kserver & Kbrowser.
- C++, IBM AIX V4.3, HP-UX V10.2 and OSF1 V4.0
- 40+ classes for histogram creation, file access, network communication and GUI management

KLOE Histogram Monitoring System

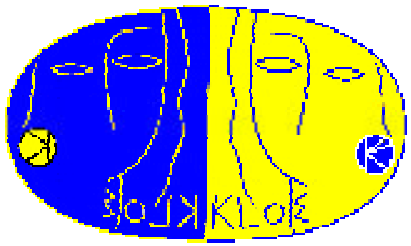




Kserver

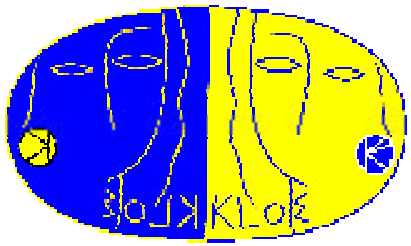


- Kserver:
  - Create histograms from online Kid and offline raw files
  - Tree of thousands histograms
  - ECal, QCal, Drift Chamber, Trigger, FEE
- Actions
  - Send the tree structure to a client

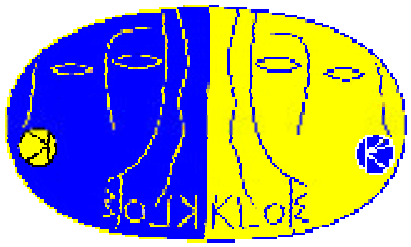


- Send a single histogram content
- Send the contents of a set of histograms
- Reset the contents of all histograms
- Save all current histograms into a ROOT file
- Set the value of an internal parameter (e.g. enable/disable the filling of a tree branch)
- Send the value of internal parameters

Kbrowser

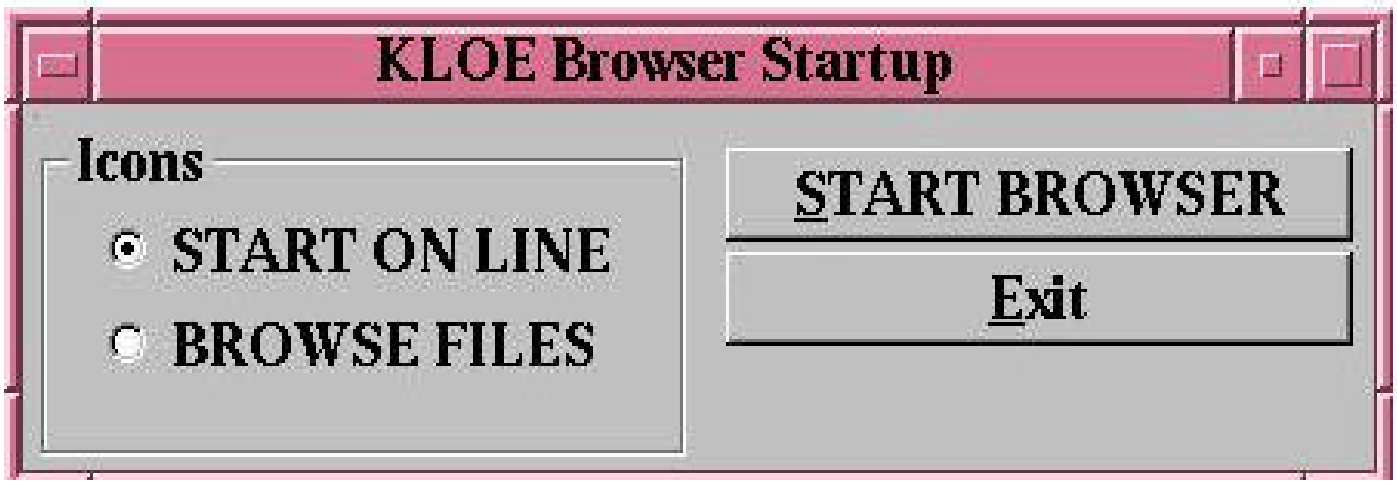


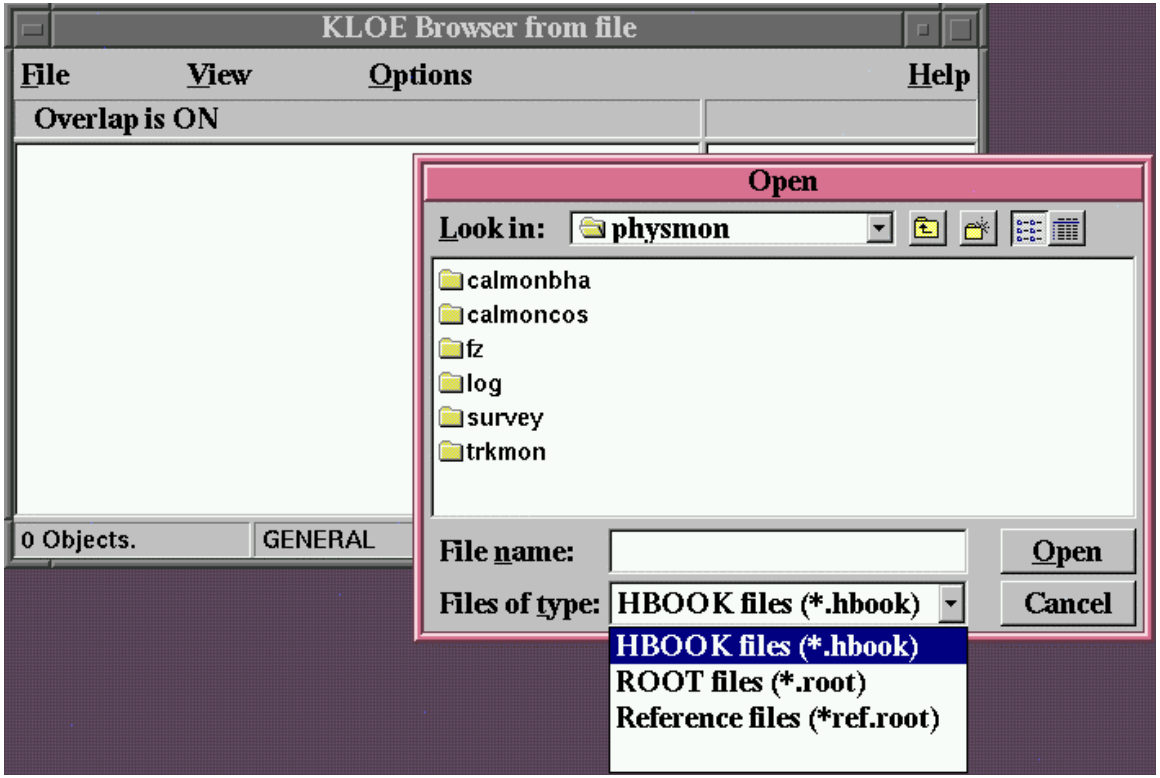
- Browse histograms from Kserver or ROOT/HBOOK files
- Display histograms with/without references
- Draw histograms in single pad mode or together

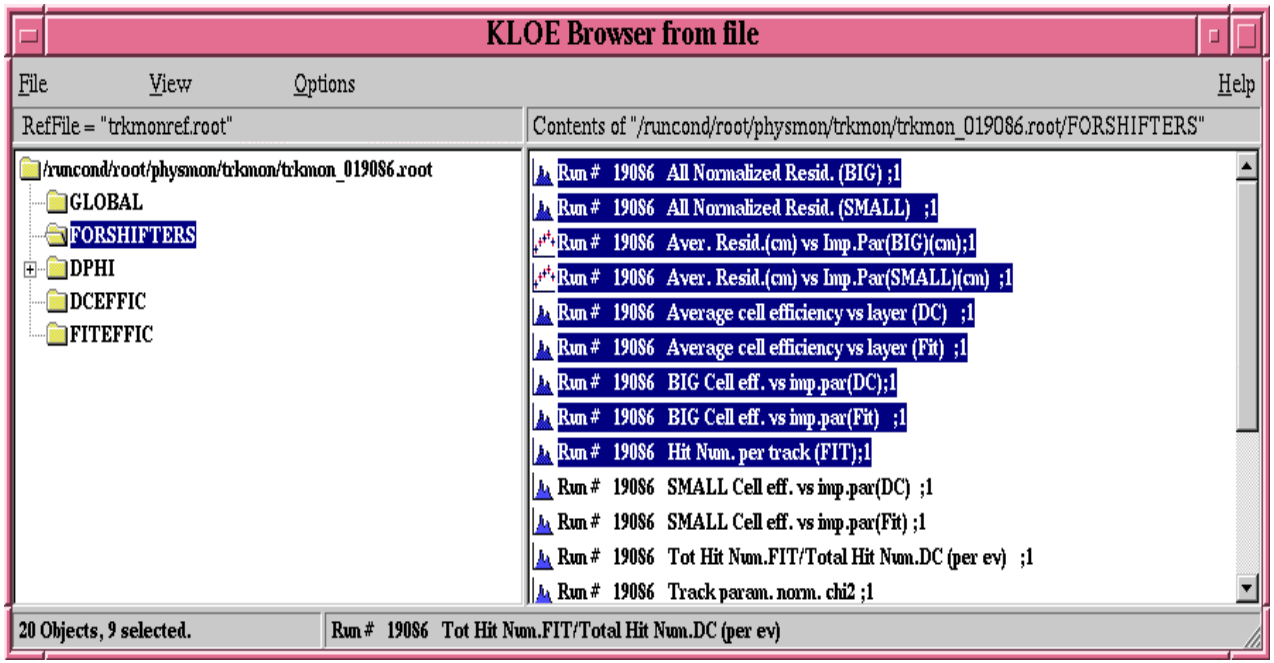


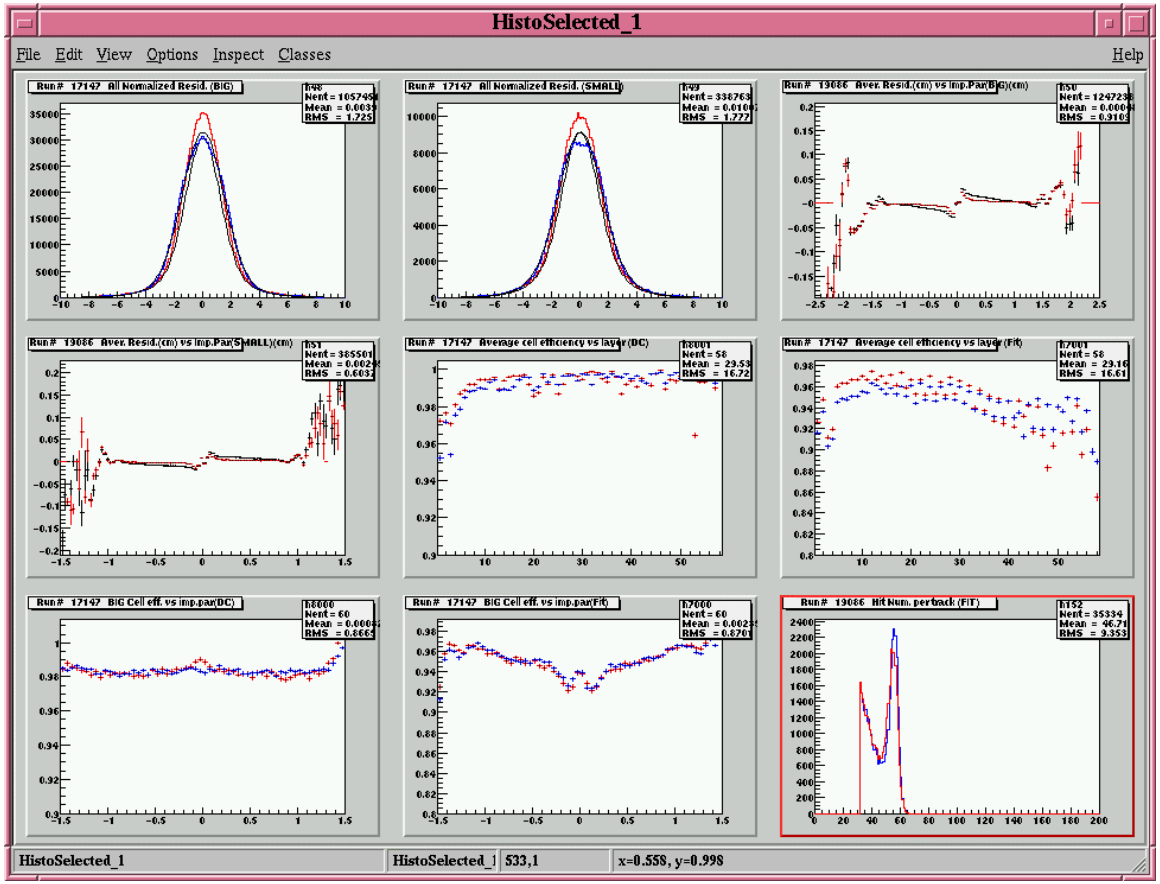
4. An Example of the Use of the KLOE Histogram Monitoring System

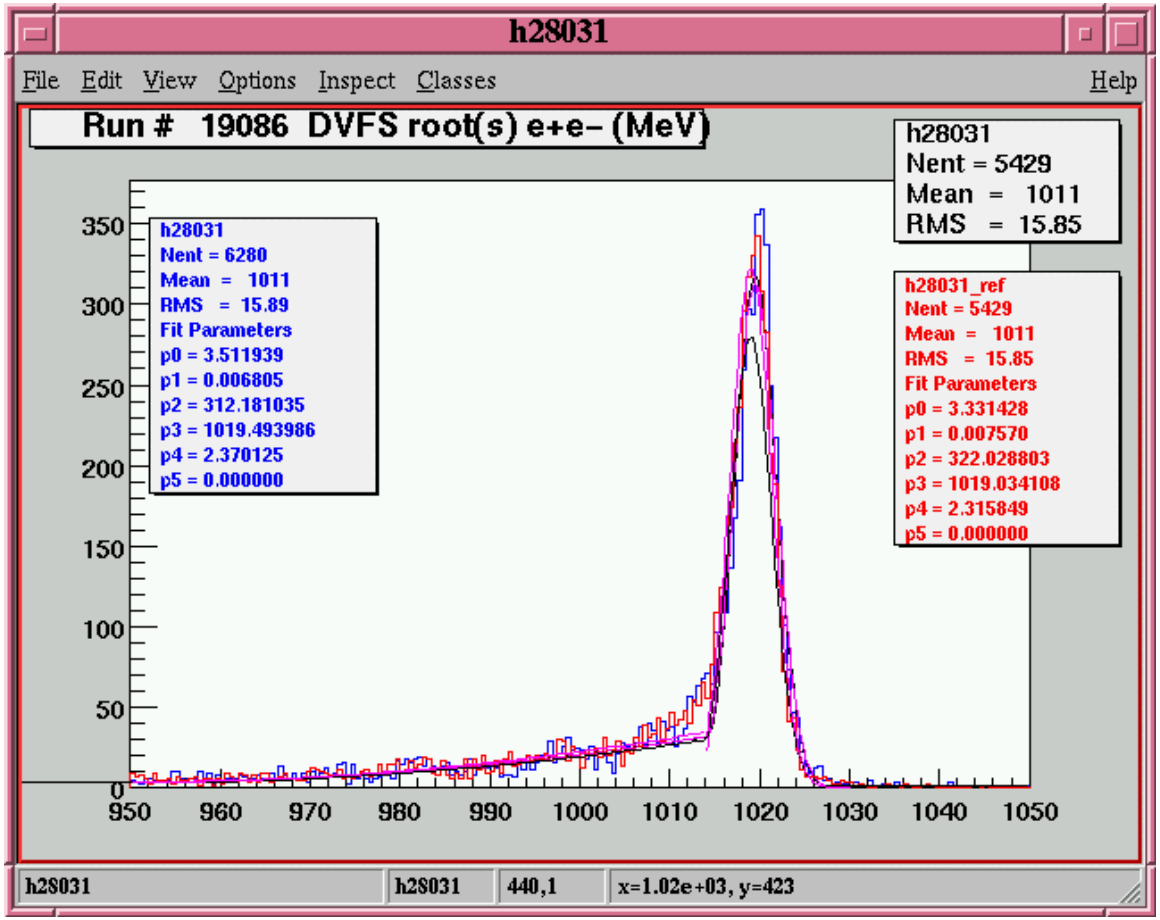
- “Start_kserver” command activates a shell script starting Kserver
- Start_kbrowser command activates a shell script starting Kbrowser


KLOE Browser Startup
Icons
START ON LINE
BROWSE FILES
START BROWSER
Exit

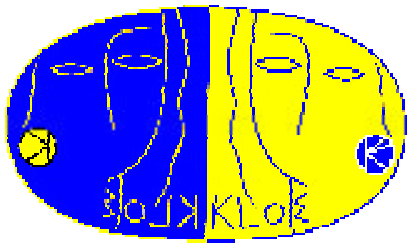

KLOE Browser from file
File
View
Options
Help
Overlap is ON
0 Objects.
GENERAL
Open
Look in:
physmon
calmonbha
calmoncos
fz
log
survey
trkmon
File name:
Open
Files of type:
HBOOK files (*.hbook)
Cancel
HBOOK files (*.hbook)
ROOT files (*.root)
Reference files (*ref.root)


KLOE Browser from file
File
View
Options
Help
RefFile = "trkmonref.root"
Contents of "/runcond/root/physmon/trkmon/trkmon_019086.root/FORSHIFTERS"
/runcond/root/physmon/trkmon/trkmon_019086.root
GLOBAL
FORSHIFTERS
DPHI
DCEFFIC
FITEFFIC
Run # 19086 All Normalized Resid. (BIG) ;1
Run # 19086 All Normalized Resid. (SMALL) ;1
Run # 19086 Aver. Resid.(cm) vs Imp.Par(BIG)(cm);1
Run # 19086 Aver. Resid.(cm) vs Imp.Par(SMALL)(cm) ;1
Run # 19086 Average cell efficiency vs layer (DC) ;1
Run # 19086 Average cell efficiency vs layer (Fit) ;1
Run # 19086 BIG Cell eff. vs imp.par(DC);1
Run # 19086 BIG Cell eff. vs imp.par(Fit) ;1
Run # 19086 Hit Num. per track (FIT);1
Run # 19086 SMALL Cell eff. vs imp.par(DC) ;1
Run # 19086 SMALL Cell eff. vs imp.par(Fit) ;1
Run # 19086 Tot Hit Num.FIT/Total Hit Num.DC (per ev) ;1
Run # 19086 Track param. norm. chi2 ;1
20 Objects, 9 selected.
Run # 19086 Tot Hit Num.FIT/Total Hit Num.DC (per ev)


HistoSelected_1
File Edit View Options Inspect Classes Help
Run# 17147 All Normalized Resid. (BIG)
Run# 17147 All Normalized Resid. (SMALL)
Run# 19086 Aver. Resid.(cm) vs Imp.Par(BIG)(cm)
Run# 19086 Aver. Resid.(cm) vs Imp.Par(SMALL)(cm)
Run# 17147 Average cell efficiency vs layer(DC)
Run# 17147 Average cell efficiency vs layer(Fit)
Run# 17147 BIG Cell eff. vs imp.par(DC)
Run# 17147 BIG Cell eff. vs imp.par(Fit)
Run# 19086 Hit Num. perTrack (Fit)
HistoSelected_1
HistoSelected_1 533,1
x=0.558, y=0.998


h28031
File Edit View Options Inspect Classes Help
Run # 19086 DVFS root(s) e+e- (MeV)
h28031
Nent = 5429
Mean = 1011
RMS = 15.85
h28031
Nent = 6280
Mean = 1011
RMS = 15.89
Fit Parameters
p0 = 3.511939
p1 = 0.006805
p2 = 312.181035
p3 = 1019.493986
p4 = 2.370125
p5 = 0.000000
h28031_ref
Nent = 5429
Mean = 1011
RMS = 15.85
Fit Parameters
p0 = 3.331428
p1 = 0.007570
p2 = 322.028803
p3 = 1019.034108
p4 = 2.315849
p5 = 0.000000
350
300
250
200
150
100
50
0
950 960 970 980 990 1000 1010 1020 1030 1040 1050
h28031 h28031 440,1 x=1.02e+03, y=423

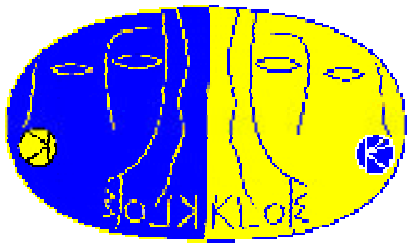
5. KGeneral



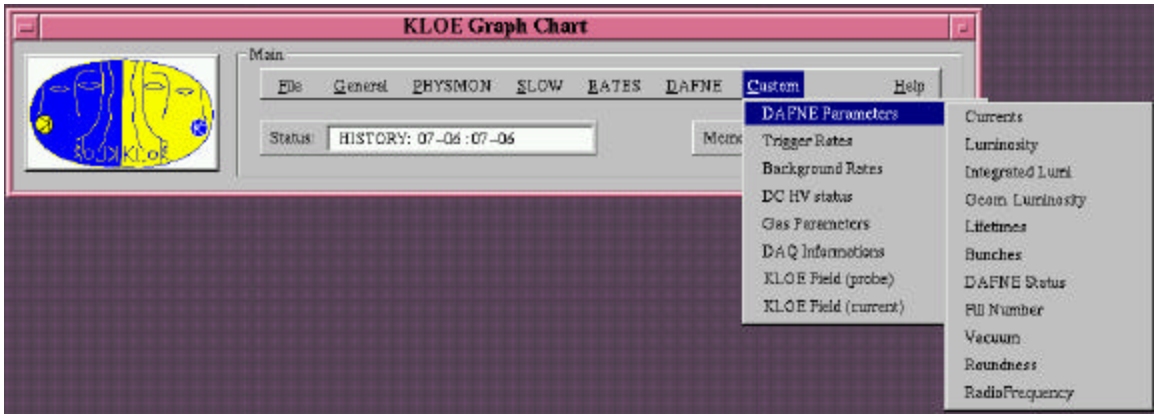
KLOE and DANE General Status Presenter

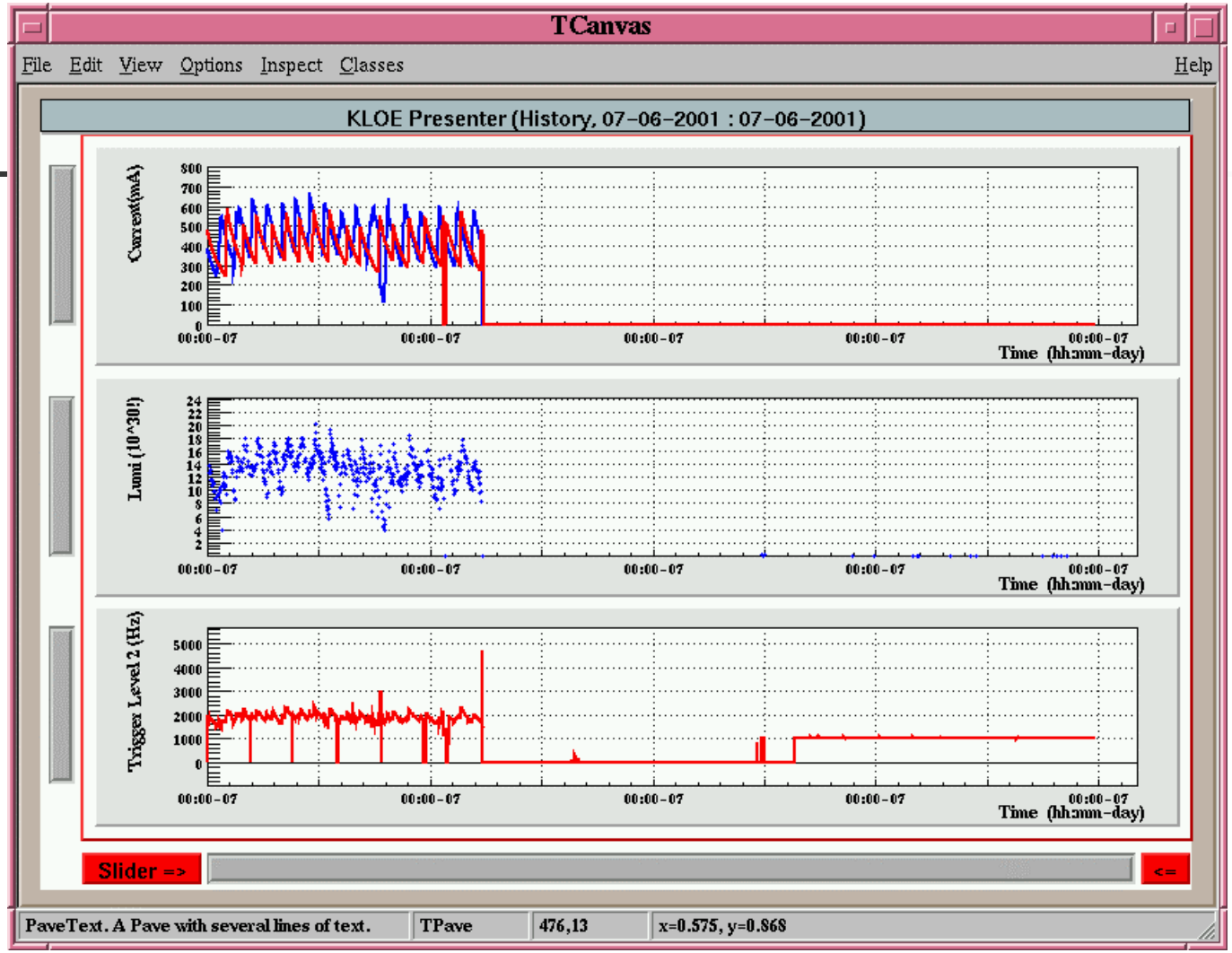
- Main program is KGeneral
  - Using C++, ROOT analysis environment

- The main functions of the KGeneral program are:

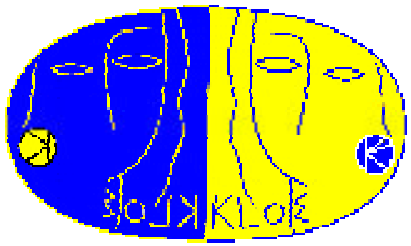


  - to read the appropriate data files and to create an ntuple structure
  - to create different time charts of the monitored parameters
  - to handle the user interface for plot requests
  - to display of the user requested plots


KLOE Graph Chart
Main
File
General
PHYSMON
SLOW
RATES
DAFNE
Custom
Help
Status
HISTORY: 07-06 : 07-06
DAFNE Parameters
Trigger Rates
Background Rates
DC HV status
Gas Parameters
DAQ Informations
KLOE Field (probe)
KLOE Field (current)
Currents
Luminosity
Integrated Lumi
Geom. Luminosity
Lifetimes
Bunches
DAFNE Status
Fill Number
Vacuum
Roundness
RadioFrequency


TCanvas
File Edit View Options Inspect Classes Help
KLOE Presenter (History, 07-06-2001 : 07-06-2001)
Current(mA)
Lumi (10^30)
Trigger Level 2 (Hz)
Time (hh:mm-day)
Slider =>
<=
PaveText. A Pave with several lines of text.
TPave
476,13
x=0.575, y=0.868

6.Problems related with ROOT



1) HBOOK to ROOT conversion lose message of fitted parameters
2) Hard to follow up the frequently updated ROOT version