Optics Calibrations

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Documentation

- "Spectrometer constant determination for the Hall-A High Resolution Spectrometer pair", JLAB-TN-01-049

- "Optics optimization of the Hall-A High Resolution Spectrometer pair", JLAB TN
  (rough available at
  http://www.jlab.org/ nilanga/physics/optimization.ps)

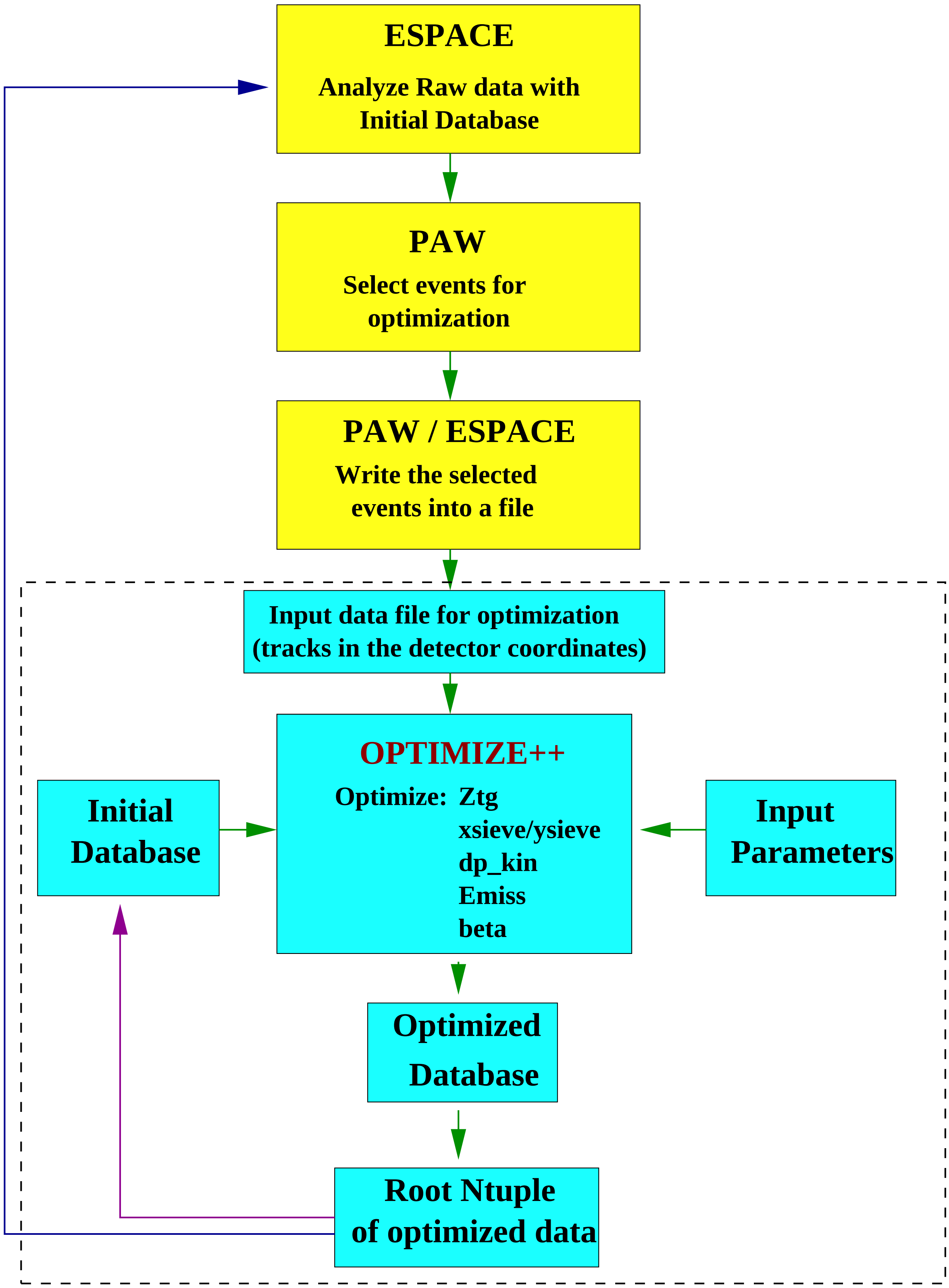
New Database optimization routine: Optimize++

Why do we need something New ?

- Espace optimization routines were written for low energy Mainz experiments: for ^{12}C(ee) data.
- We need something that works at higher energies. Low cross sections exclude ^{12}C(ee).
- Difficult to use: tedious work and time consuming: $\sim$ 1-2 months for a full optimization
- Hysteresis problem forced us to re-do all the optimization.
- New projects ahead: Beyond 4 GeV, Septum, MAD ....

The new code

- Stand alone code.
- Use standard library functions for optimization.
- $\Longrightarrow$ Easy to manage and handle.
- Written in C++: sort of
- Will work with new C++ event analyzer.
- Optimizes:
  - offsets
  - y_{tg}
  - θ_{tg}/ϕ_{tg}.
  - Kimenatically corrected momentum at low momenta.
  - Emiss at high momenta
  - Scintillator offsets (for β and coincidence TOF)
  - Other detector optimizations possible
- Easy to use


ESPACE
Analyze Raw data with
Initial Database
PAW
Select events for
optimization
PAW / ESPACE
Write the selected
events into a file
Input data file for optimization
(tracks in the detector coordinates)
OPTIMIZE++
Optimize: Ztg
xsieve/ysieve
dp_kin
Emiss
beta
Initial
Database
Input
Parameters
Optimized
Database
Root Ntuple
of optimized data

Optics data needed:

- A five step delta scan of the ^{12}C(e,e) peak.
- Best done at one pass ($E_0 < 1$ GeV)
- Spectrometers at $< 16^o$ in - polarity.
- Sieve slit on both spectrometers.
- No raster, Fast-feed-back on.
- Requires about 1 shift.

If this is not possible

- Quasi-elastic ^{12}C(e,e$'$) data in negative polarity.

Requirements:

- Has to be done during the experiment.
- Survey of both spectrometers.
- BPM-Harp calibration to center the beam

To check optics (and a lot of other things)

- At every setting of each spectrometer take 5 min. of data with the optics target.

.kumac files available for testing optics using this data