
SHORT MOTIVATION

- **ACCEPTANCE matrices**

- Why? Because everything we measure is first limited with the geometry (acceptance) of our spectrometer.
- We have only what we measure, the rest is extrapolation to 4π .
- It is important to have large acceptance to see the most of phase space.
- Important factors: geometry (target position, alignment) and magnetic field
- Each particle species has its own acceptance filter

- **EFFICIENCY matrices**

- Why? Because we have to understand our detector performance and algorithms performance. No one is interested in it – we have to correct the results with respect to inefficiencies of our spectrometer/analysis.
- Efficiency is very dependent on the experimental run, that is the detailed performance of all detectors and current version of the code.
- We need to model detector response the best we can to produce EFF matrix
- All cuts (single, pair) as in analysis have to be evaluated

- **FILTERING**

- We filter all theoretical (PLUTO, transport models) models with ACC filters
 - We correct experimental spectrum with EFF filters
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ACCEPTANCE AND EFFICIENCY MATRICES

Witold Przygoda (GSI, 6 July 2007)

■ **PRODUCTION** based on

- UrQMD simulated events (background) → track embedding since now
- HGEANT
- HYDRA
- 5 „white” tracks (e+ or e-) / event
 - 1 file: 100.000 UrQMD events → 500.000 white tracks
- statistics available (at the moment): 40 files (both for e+ and e-) → 20.000.000 white tracks

■ **MATRICES AVAILABLE**

- Acceptance:
 - Nov02, Jan04, Aug04
- Efficiency:
 - Nov02, Aug04

■ **ALGORITHMS**

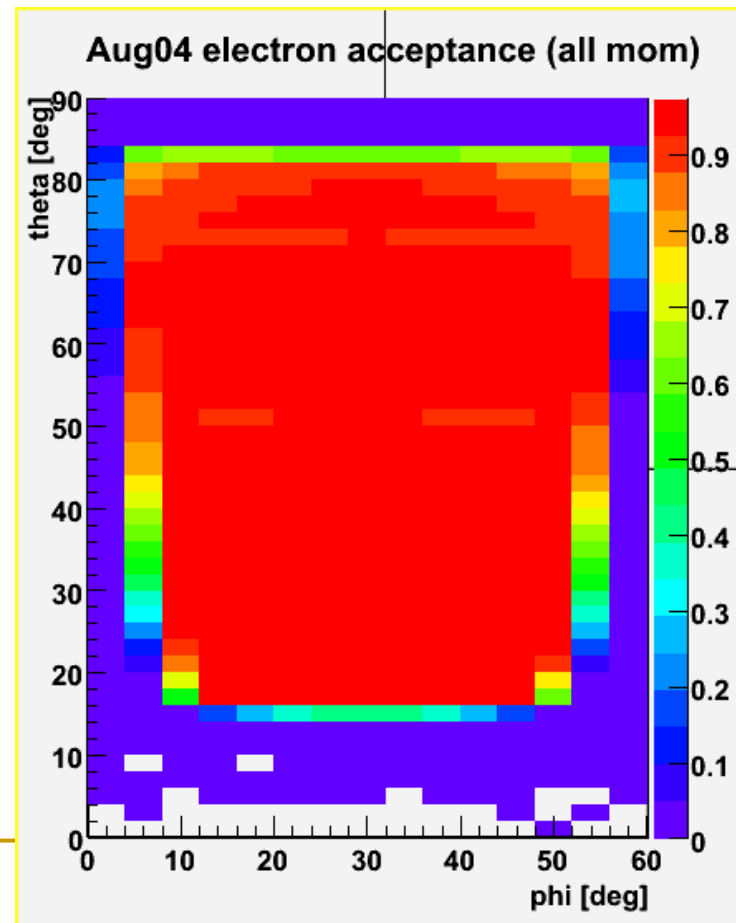
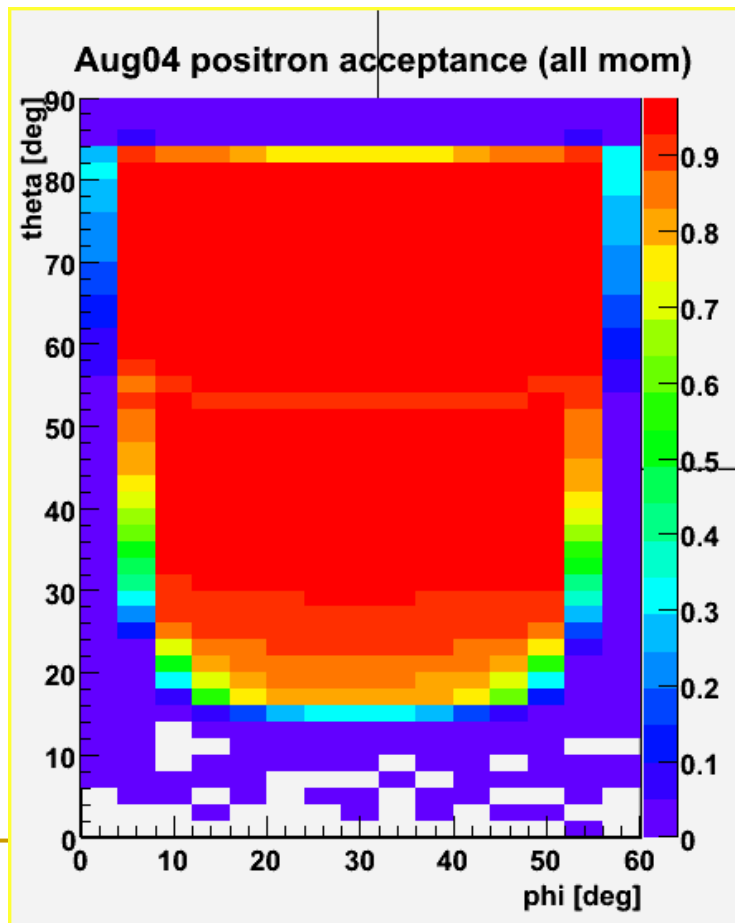
- ACC
 - MDC I and MDC II and MDC III and MDC IV and (TOF or PreSHOWER)
 - NO DIFFERENCE if I do not take MDC III or I take MDC IV
 - EFF white tracks (homogeneous momentum, theta, phi) embedded into UrQMD-simulated background
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ACCEPTANCE MATRIX production

- HGeant simulation:
 - Input: single tracks with white distribution
(θ : 0-90, φ : 0-360, p : 0-2000 MeV/c /hadrons: more/)
 - Geometry: real (with alignment),
target position the most important
 - Reconstructor:
 - Lepton track from generator taken (parent id == 0)
 - Checked if passed through:
any layer of MDC I **and** MDC II (**and** MDC III **and** MDC IV)
and (TOF **or** PreShower)
 - 3D histogram (momentum, theta, phi):
tracks passing through / all single tracks emitted
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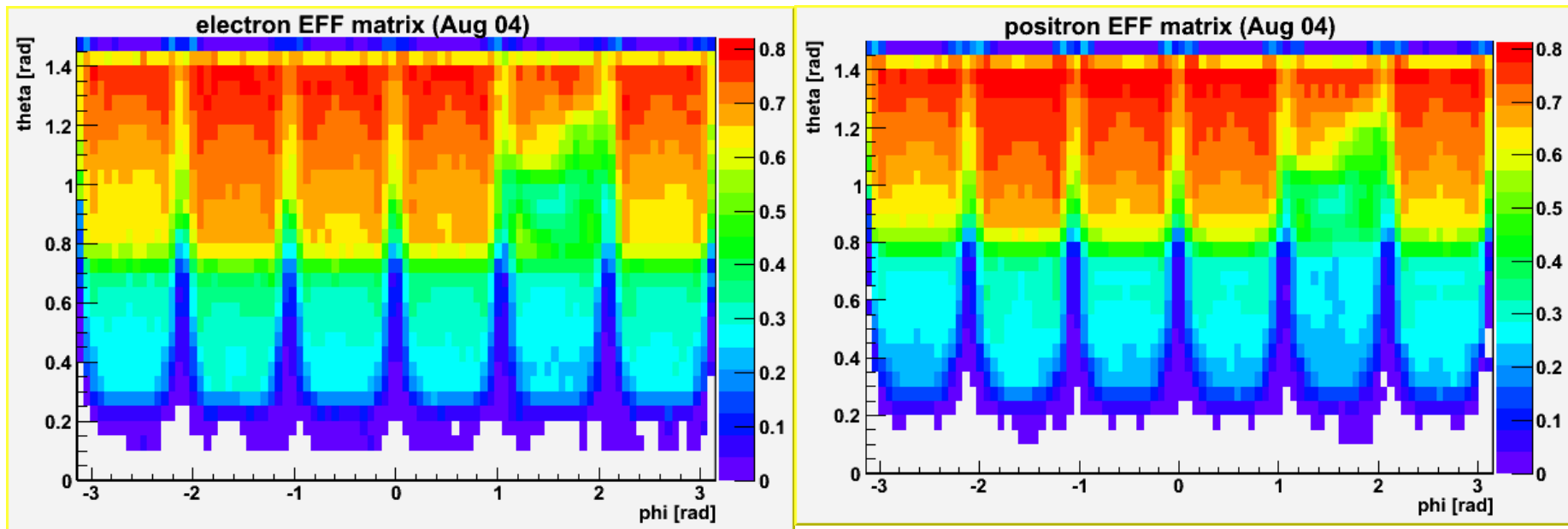
ACCEPTANCE MATRICES (statistic errors)

- ACCEPTANCE - so called „MediumRes” ... just example
- EMinusAcc – 50 MeV : 2 deg : 4 deg (0.725 field)
EPlusAcc – 50 MeV : 2 deg : 4 deg (0.725 field)
- Stat. errors 4-6%



EFFICIENCY MATRICES (statistic errors)

- effi3DEleAllCut – 4 deg (PHI) : 2.8 deg (THETA) : 100 MeV (MOM)
- effi3DPosiAllCut – 4 deg (PHI) : 2.8 deg (THETA) : 100 MeV (MOM)
- Stat. errors 7-12% (on the borders worse, up to 20%)



All momenta accumulated

FILTERING TOOL

- I have...
 - simulation from
 - PLUTO, HGEANT, transport model
 - I have...
 - acceptance matrices
 - efficiency matrices
 - I want a program which...
 - reads all input data formats (PParticle – PLUTO, HGeantKine – HGeant, ASCII data – HSD etc.)
 - reads all filter matrices
 - let me filter my particles and pairs
 - let me smear momentum, angle
 - let me define „invariant” or „missing” objects and does the whole combinatorics for me
 - writes the output to NTuple that I could easily draw the result
 - This is (almost) done and we will try it out!
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