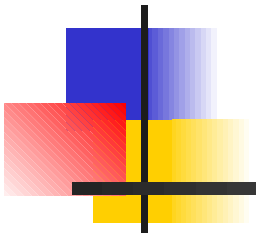
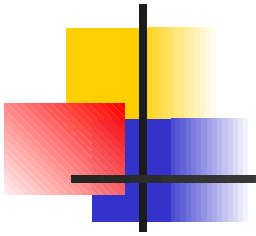


# StMuDst

## The Next Generation ?



# Current StMuDst Size

- ~1/3 of event.root
- AuAu central
  - 0.492 MBytes
  - 5M evts $\rightarrow$ 2.5 TByte
- AuAu min. bias
  - 0.138 MBytes/evt
  - 5M evts $\rightarrow$ 0.7 TByte
- pp min. bias
  - 0.01 Mbytes/evt
  - 5M evts $\rightarrow$ 0.05 TByte (typical laptop disk)

# A Closer Look at a Central AuAu Event

| Data | n | size/byte | total/Mbyte |
|---|---|---|---|
| RichSpectra | 333 | 100 | 0.033 |
| Kink | 549 | 180 | 0.099 |
| Evts | 65 | 16816 | 1.09 |
| L3 Tracks | 10704 | 184 | 1.97 |
| V0 | 44213 | 152 | 5.30 |
| Primary Tracks | 78635 | 184 | 14.47 |
| Xi | 77296 | 196 | 15.15 |
| Global Tracks | 159876 | 184 | 29.42 |
| Total/Disk Size | | | 67.5/46.2 |

# StMuTrack

| | Byte | |
|---|---|---|
| Short_t mId; | 2 | |
| Short_t mType; | 2 | |
| Short_t mFlag; | 2 | |
| ~~Int_t mIndex2Global;~~ | 4 | |
| ~~Int_t mIndex2RichSpectra;~~ | 4 | |
| UChar_t mNHits; | 1 | |
| UChar_t mNHitsPoss; | 1 | |
| UChar_t mNHitsDedx; | 1 | |
| UChar_t mNHitsFit; | 1 | |
| ~~UShort_t mPidProbElectron;~~ | 2 | |
| ~~UShort_t mPidProbPion;~~ | 2 | |
| ~~UShort_t mPidProbKaon;~~ | 2 | |
| ~~UShort_t mPidProbProton;~~ | 2 | |
| ~~Int_t mNSigmaElectron;~~ | 4 | |
| ~~Int_t mNSigmaPion;~~ | 4 | |
| ~~Int_t mNSigmaKaon;~~ | 4 | |
| ~~Int_t mNSigmaProton;~~ | 4 | |
| Float_t mdEdx; | 4 | |
| Float_t mChiSqXY; (ChiSq) | 4 | |
| Float_t mChiSqZ; (CL) | 4 | 1 |
| ~~Float_t mPt;~~ | 4 | |
| ~~Float_t mEta;~~ | 4 | |
| ~~Float_t mPhi;~~ | 4 | |
| StTrackTopologyMap mTopologyMap; | 8 | |
| ~~StThreeVectorF mP;~~ | 12 | |
| ~~StThreeVectorF mDCA;~~ | 12 | |
| ~~StThreeVectorF mDCAGlobal;~~ | 12 | |
| StThreeVectorF mFirstPoint; | 12 | |
| ~~StThreeVectorF mLastPoint;~~ | 12 | |
| StMuHelix mHelix; | 30 | 24 |
| StMuHelix mOuterHelix; | 30 | 24 |
| | 184 | |
| char mCharge | 1 | |

Aihong's Pid table
Bethe-Bloch

88/184 = 0.48

# StV0MuDst

| | |
|---|---|
| Float_t mDecayVertexV0X; | 4 |
| Float_t mDecayVertexV0Y; | 4 |
| Float_t mDecayVertexV0Z; | 4 |
| Float_t mDcaV0Daughters; | 4 |
| Float_t mDcaV0ToPrimVertex; | 4 |
| Float_t mDcaPosToPrimVertex; | 4 |
| Float_t mDcaNegToPrimVertex; | 4 |
| Float_t mMomPosX; | 4 |
| Float_t mMomPosY; | 4 |
| Float_t mMomPosZ; | 4 |
| Float_t mMomNegX; | 4 |
| Float_t mMomNegY; | 4 |
| Float_t mMomNegZ; | 4 |
| UShort_t mKeyPos; | 2 |
| UShort_t mKeyNeg; | 2 |

| | |
|---|---|
| StTrackTopologyMap mTopologyMapPos; | 8 |
| StTrackTopologyMap mTopologyMapNeg; | 8 |
| Float_t mChi2V0; | 4 |
| Float_t mClV0; | 4 |
| Float_t mChi2Pos; | 4 |
| Float_t mClPos; | 4 |
| Float_t mChi2Neg; | 4 |
| Float_t mClNeg; | 4 |
| Float_t mDedxPos; | 4 |
| Float_t mDedxNeg; | 4 |
| Float_t mErrDedxPos; | 4 |
| Float_t mErrDedxNeg; | 4 |
| UShort_t mNumDedxPos; (length) | 4 |
| UShort_t mNumDedxNeg; (length) | 4 |

120 Bytes

store with Track (track properties anyway)

4 / 120 = 0.03

# StXiMuDst (StV0MuDst)

| | |
|---|---|
| Int_t mCharge; | 4 |
| Float_t mDecayVertexXiX; | 4 |
| Float_t mDecayVertexXiY; | 4 |
| Float_t mDecayVertexXiZ; | 4 |
| Float_t mDcaXiDaughters; | 4 |
| Float_t mDcaBachelorToPrimVertex; | 4 |
| Float_t mDcaXiToPrimVertex; | 4 |
| Float_t mMomBachelorX; | 4 |
| Float_t mMomBachelorY; | 4 |
| Float_t mMomBachelorZ; | 4 |
| UShort_t mKeyBachelor; | 2 |
| StTrackTopologyMap mTopologyMapBachelor; | 8 |
| Float_t mChi2Xi; | 4 |
| Float_t mClXi; | 4 |
| Float_t mChi2Bachelor; | 4 |
| Float_t mClBachelor; | 4 |
| Float_t mDedxBachelor; | 4 |
| Float_t mErrDedxBachelor; | 4 |
| UShort_t mNumDedxBachelor; | 2 |

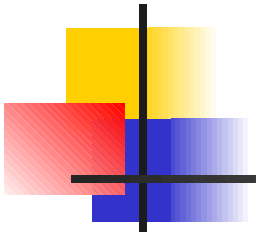
| | |
|---|---|
| UShort_t mV0TrackIdPos; | 2 |
| UShort_t mV0TrackIdNeg; | 2 |
| UShort_t mBaTrackId; | 2 |
| UShort_t mV0Id; | 2 |
| UShort_t mTrackId; | 2 |

6 / (196) = 0.03

76+120 Bytes

# A New Look at a Central AuAu File

| Data | n | size/b | total/Mbyte | size/b | Total/MByte |
|---|---|---|---|---|---|
| RichSpectra | 333 | 100 | 0.033 | | 0.033 |
| Kink | 549 | 180 | 0.099 | | 0.099 |
| Evts | 65 | 16816 | 1.09 | | 1.09 |
| L3 Tracks | 10704 | 184 | 1.97 | 88 | 0.94 |
| V0 | 44213 | 152 | 5.30 | 4 | 0.18 |
| Primary Tracks | 78635 | 184 | 14.47 | 88 | 6.92 |
| Xi | 77296 | 196 | 15.15 | 6 | 0.46 |
| Global Tracks | 159876 | 184 | 29.42 | 88 | 14.6 |
| Total/Disk Size | | | 67.5/46.2 | | 24.3/16.4 |



# Conclusions

- We can bring the size down to 1/3 (1/10) of the current MuDst (StEvent)
- We can use the same user interface
3. It will result in computing a lot of values
   - V0s, Xis
   - PID values
- PID tables would have to be available
- We would like to add EMC and TOF info