

ESD/AOD and strangeness



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Content

- Vertexer: V0 On the fly
- Vertexer: V0 offline vertexer
 - David's improvements
- ESD/AOD content
- Reduction

Vertexer: V0 on fly

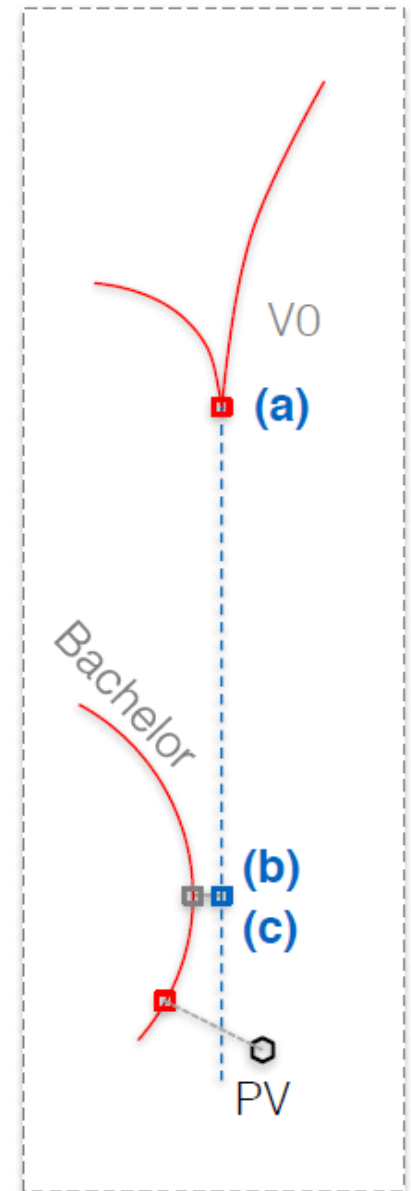
- Runs during tracking
- Uses track seeds as input
- Track defined at V0 vertex including
 - Correct propagation
 - Full covariance matrix
- DCA to PV cut to reject primaries is PID dependent
 - Reconstruction PID is used

Vertexer: V0 offline

- Runs after tracking
- Input: tracks defined at DCA to primary vertex (PV)
 - May violate causality (hits between V0 vertex and PV)
 - Propagation to V0 vertex is done without material corrections

V0 offline – David's improvements

- V0 DCA (a)
 - Estimate minima in 2D XY
 - Find best minimum in 3D
- Bachelor DCA (b)
 - Helix approximation instead of linear
- Cascade DCA (c)
 - Old vertexer $\vec{r}_{decay} = 0.5\vec{r}_{bach} + 0.5\vec{r}_{V0}$
 - New vertexer
$$\vec{r} = [C_{bach}^{-1} + C_{V0}^{-1}]^{-1} \times [C_{bach}^{-1}\vec{r}_{bach} + C_{V0}^{-1}\vec{r}_{V0}]$$
 - How C is calculated ?



Status/conclusion

- Improvement in cascade efficiency compared using findable candidate
 - High p_T - 20% (a+b)
 - Low p_T - 20% (c)
- Improvement in V0 efficiency probably not big
- More intensive tests on data needed
- Implemented at `AliAnalysisTaskWeakDecayVertexer.cxx`
 - Fully customizable
- <https://indico.cern.ch/event/671070/contributions/2754625/attachments/1541242/2417034/DDChinellato-PWGLF-VertexerImprovements-04.pdf>
- "findable": a true MC V0 or cascade whose daughter particles are all picked up (even if poorly) by our reconstruction as AliESDtracks

V0 vertexers comparison

	Offline	On fly
Reconstructed tracks	X	-
Track seeds	-	X
Causality	-	OK
Tracks defined at	Primary vertex	V0 vertex
Propagation to V0 vertex	Wrong	OK
CovMatrix at V0 vertex	-	YES
PID used at DCA tp PV	NO	YES
Rerun from ESD	YES	NO
Rerun from AOD	NO	NO

ESD/AOD content

- ESD branches
 - Tracks – all tracks
 - V0 - both On the Fly and Offline (fOnFlyStatus)
 - Cascade
- AOD
 - Tracks – only primary
 - V0 (kinematics) -both On the Fly and Offline (fOnFlyStatus)
 - Vertices (position)
 - Cascade
- Redundancy
 - On the Fly/Offline in ESD/AOD
 - Tracks in offline V0 in ESD are same as in track branch

Data volume

- pp LHC17k/000276348 190 kHz (Ruben)
- PbPb (LHC15o/000246858, 7kHz (Ruben)
- XeXe , 100Hz (Livio)
- [%] = fraction of data on disk


	ESD V0 [%]		AOD V0 [%]	
System	Off+OtF	OtF	Off+OtF	OtF
pp	12	20	20	20
XeXe	33		22	
PbPb	37	50	42	50

Reduction of ESD

- Discussion organised by Ruben in Jan-Feb 2016:
- <https://alice.its.cern.ch/jira/browse/PWGPP-185>
- Agreed measures (but not implemented yet):
 - Elimination of stored prong's kinematics for offline v0 => reduces by 65% the size of the AliESDv0 objects
 - Cut $|\eta_{v0}| < 1$ => removes 25% of all V0s
 - removal of V0s do not matching to mass of any interesting particle with good safety margin => removes 60% of all V0s
- Total reduction
 - $f(\text{offline}) * 0.35 * 0.4 + (1 - \text{offline}) * 0.4 \sim 23\%$ ($f(\text{offline}) = 2/3$)
 - To be implemented by end of 2017
 - Full offline removal is also option ($\sim 0.13\%$)

Summary

- AODs not used in Strangeness PAG
 - No possibility to rerun V0
- Reduction of V0 in ESD/AOD
 - by Ruben proposal to 23% of current size
- Removal of all offline V0 not excluded



■ Backup