Strangeness: Λ^0 identification in the ALICE experiment

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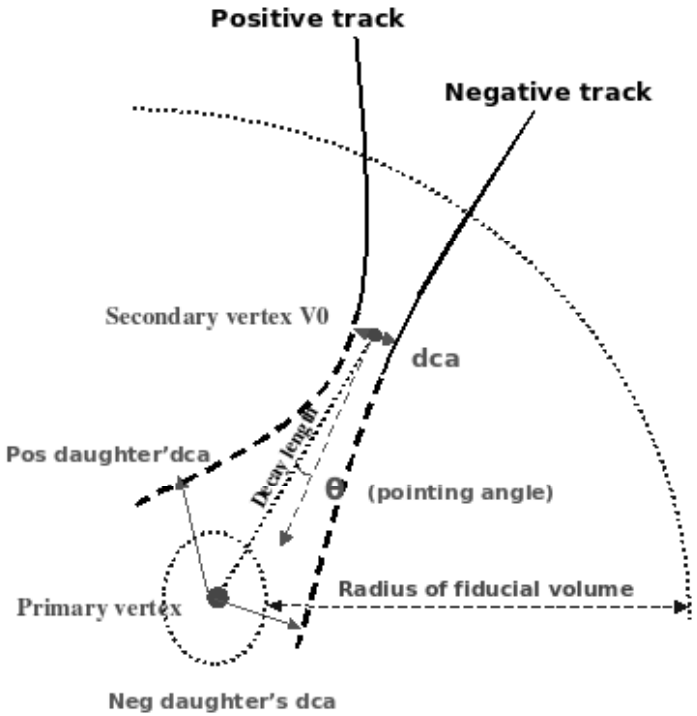
Contents

Introduction

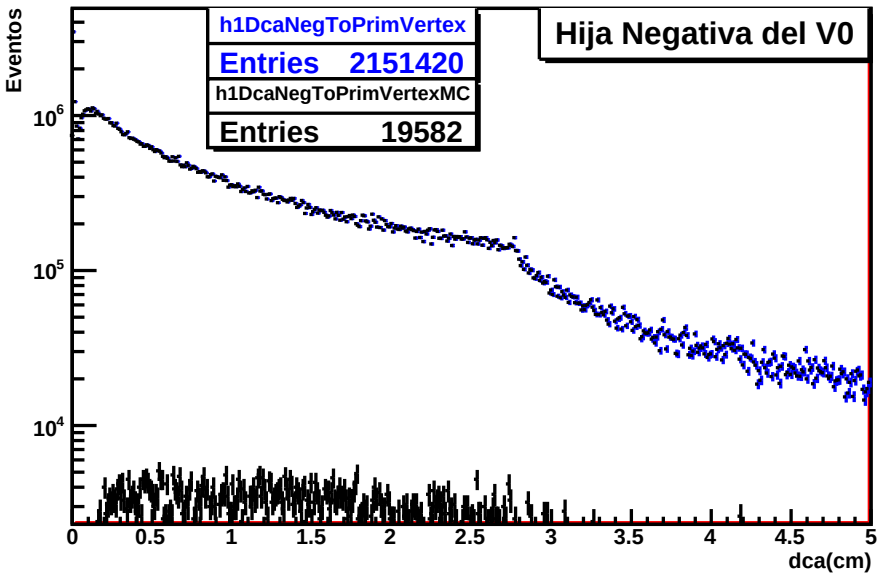
The Λ^0 finding procedure starts with the selection of secondary tracks. Every secondary track is combined with all the other secondary tracks having an opposite charge to define the secondary vertex position. The distance between the daughter's tracks, should be less than certain value (DCA between daughters). The daughter's tracks are extrapolated to measure the impact parameters (DCA of positive/negative daughter) and reject tracks with DCA larger than a given value.
Afterward the vertex position is defined, the Λ^0 finding procedure checks whether the momentum of the candidate points well back to the primary vertex.

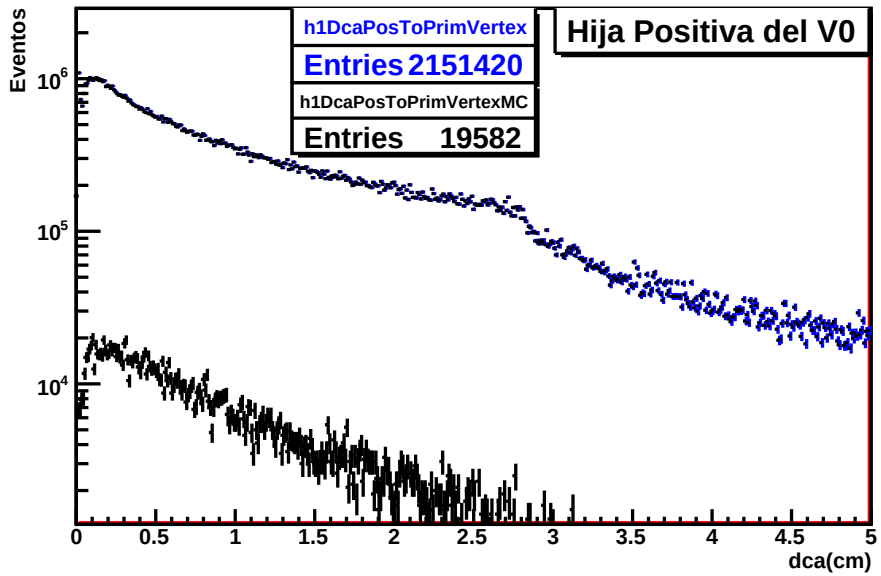
Geometrical Selection for secondary vertex reconstruction

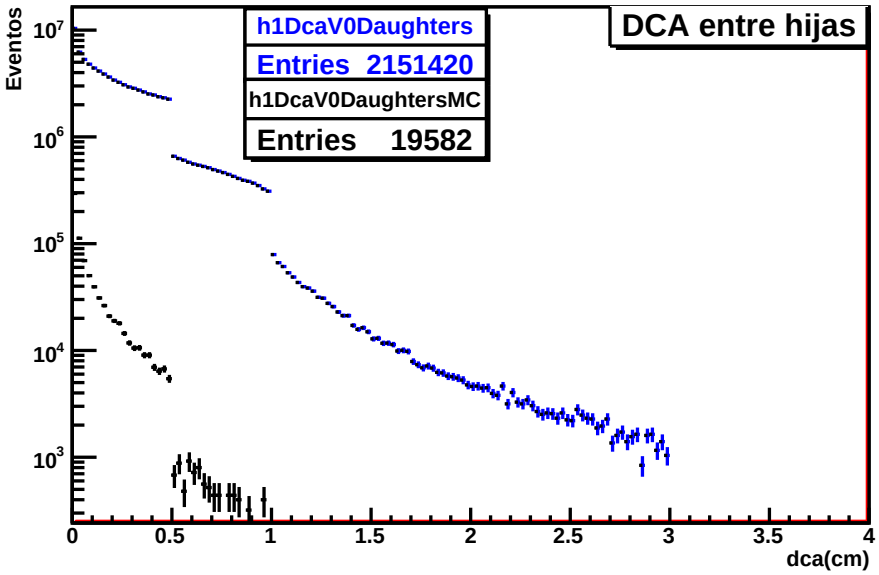
We ask for the cuts in these variables that allow us to have a larger number of reconstructed Λ^0s.

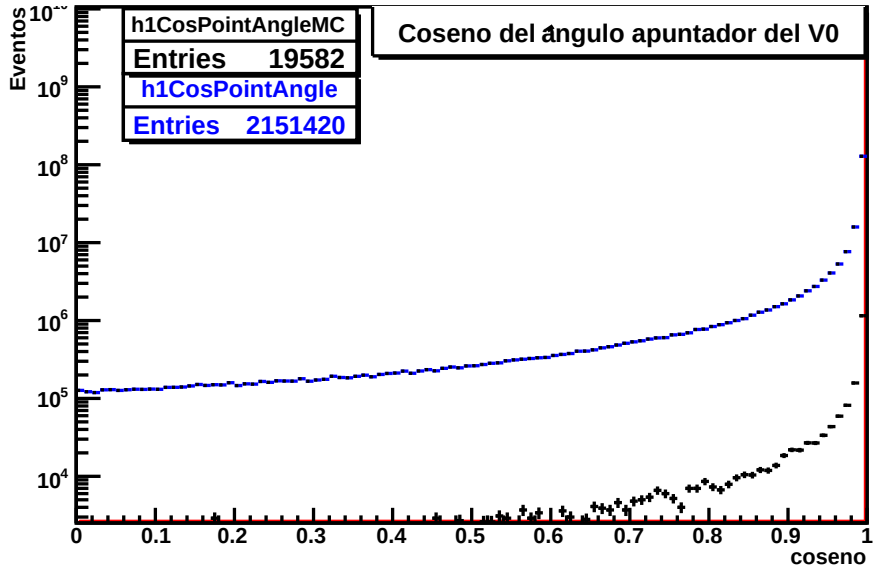


Geometrical Distribution of Λ^0

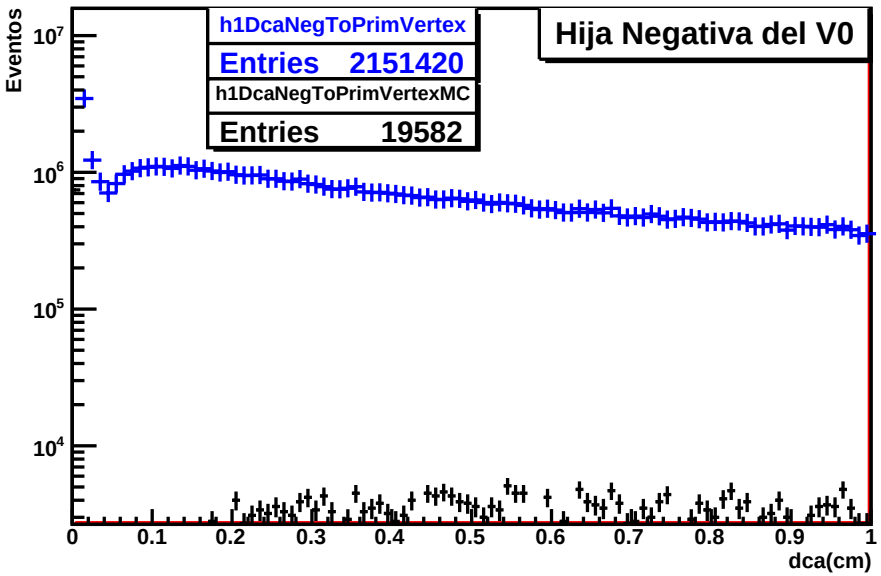


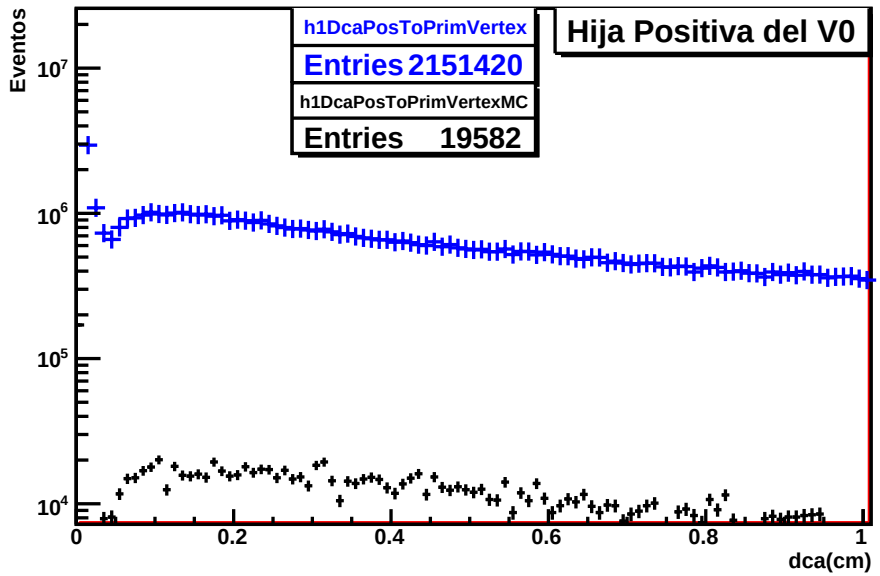


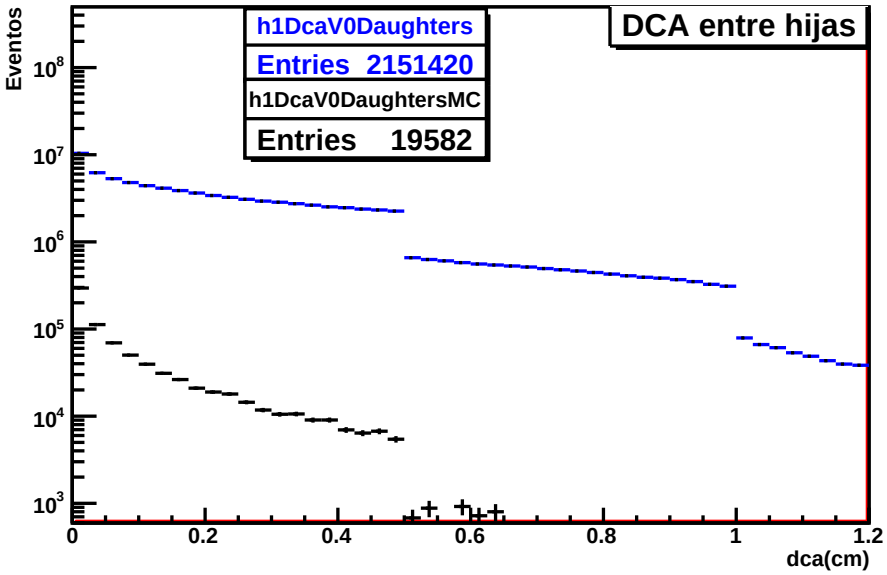


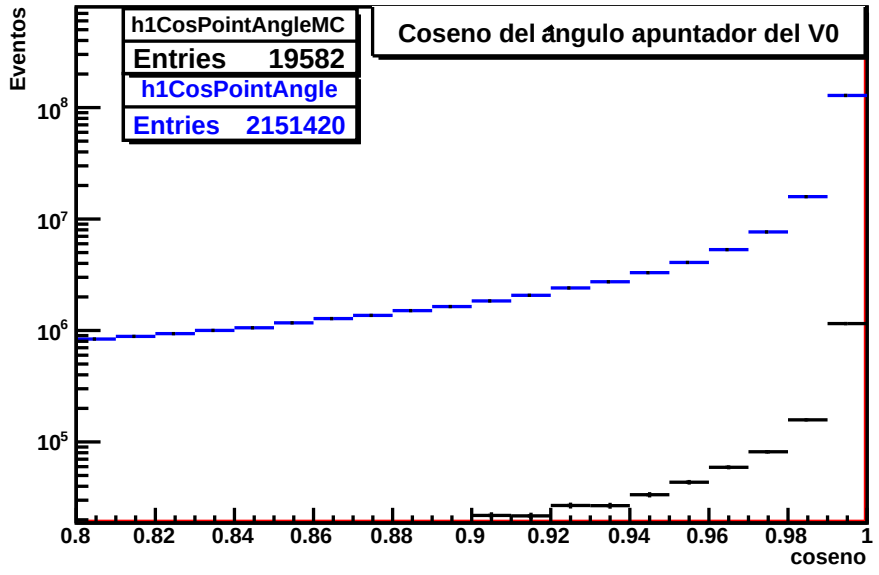


Geometrical Distribution of Λ^0 (zoom)







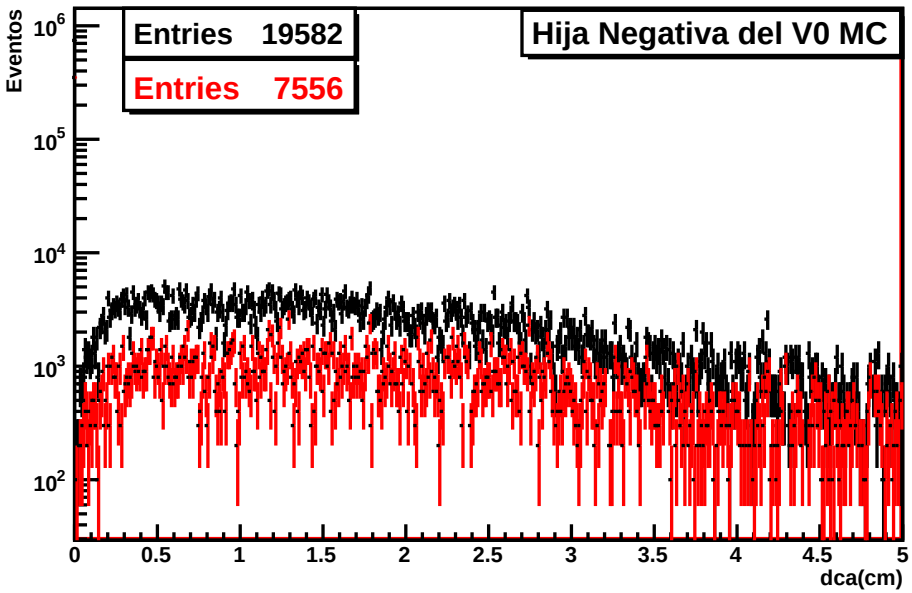


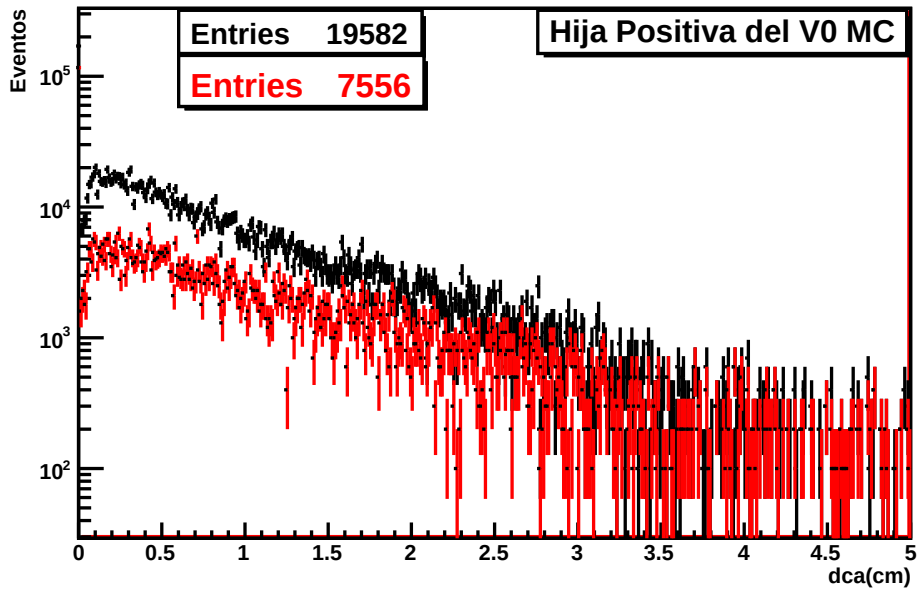
All Λ^0's percentage after cuts

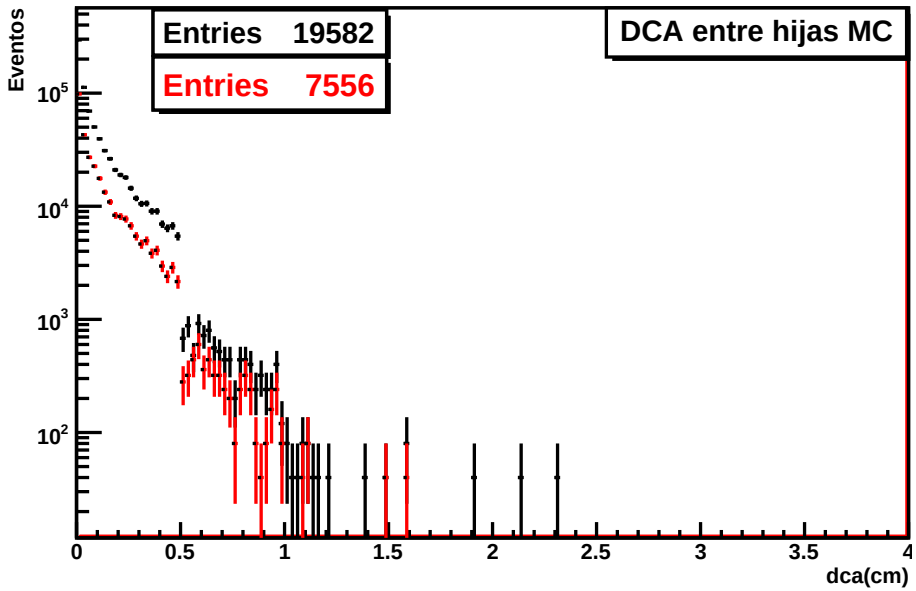
Table: Geometrical selections

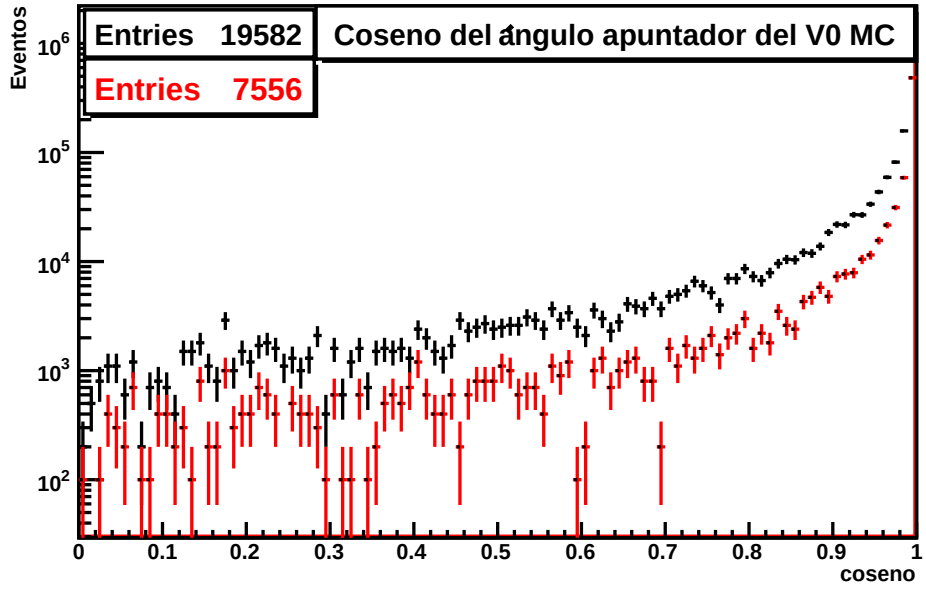
Parameter	Cut	Entries	%
DCA positive daughter	0	19582	100
	> 0.036	17743	90
	> 0.1	16818	85
DCA negative daughter	0	19582	100
	> 0.036	12143	62
	> 0.15	12011	61
DCA between daughters	0	19582	100
	< 0.5	19344	98
	< 0.15	2116	10
Cosine of pointing angle	$0 < cos\theta < 1$	19582	100
	> 0.99	13110	66
	> 0.999	11532	58

Geometrical Distribution of primary Λ^0









Primary Λ^0's percentage after cuts

Table: Geometrical selections

Parameter	Cut	Entries	Primary %	All %
DCA positive daughter	0	7556	100	
	> 0.036	6355	84	90
	> 0.1	6091	80	85
DCA negative daughter	0	7556	100	
	> 0.036	4051	53.61	62
	> 0.15	4013	53.11	61
DCA between daughters	0	7556	100	
	< 0.5	7431	98	98
	< 0.15	1274	16	10
Cosine of pointing angle	$0 < cos\theta < 1$	7556	100	
	> 0.99	5427	71	66
	> 0.999	4839	64	58

Summary

1. The strongest cuts in DCA of negative/positive daughter reject less than 5 % of the particles, but these correspond to the interval where the graphs show major discrepancy
2. The strongest cuts in DCA of negative/positive daughter and Cosine of pointing angle does not change significantly the statistics, but the DCA between daughters if