He Monte Carlo truth studies

Antimatter meeting 01.02.2024

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Updates:

The goal:

Identify different background (*"bad"* reconstructed events) samples using Monte Carlo truth.

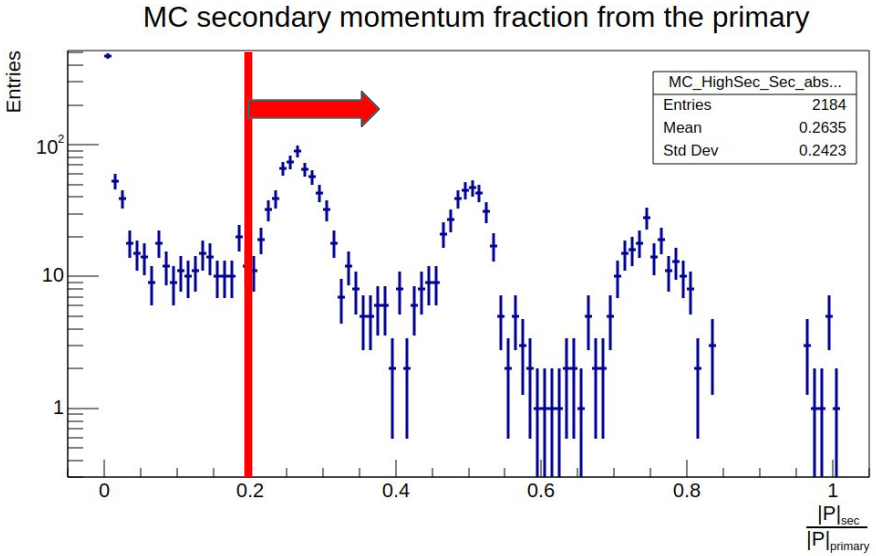
Work strategy:

1. Look after the secondary with the momentum absolute value, more consistent with that of the primary.
2. Look at the difference in momentum between this secondary and the primary
3. Set a lower threshold on the variation of momentum (avoid low energy secondaries).
4. Require a charge = 2 secondary.

How to choose the correct secondary?

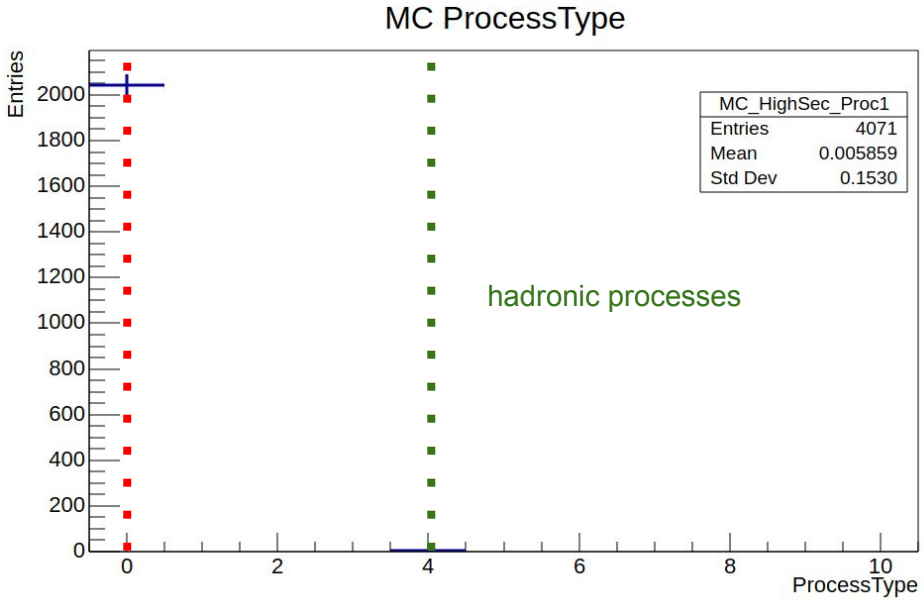
Loop on the secondaries:

- only daughters of the primary are considered (Parent ID = 1)
- Check the generation Z coordinate of the secondary.
- Get primary momentum at the previous checkpoint.
- Select the secondary with the highest ratio $\frac{|P|_{sec}}{|P|_{primary}}$



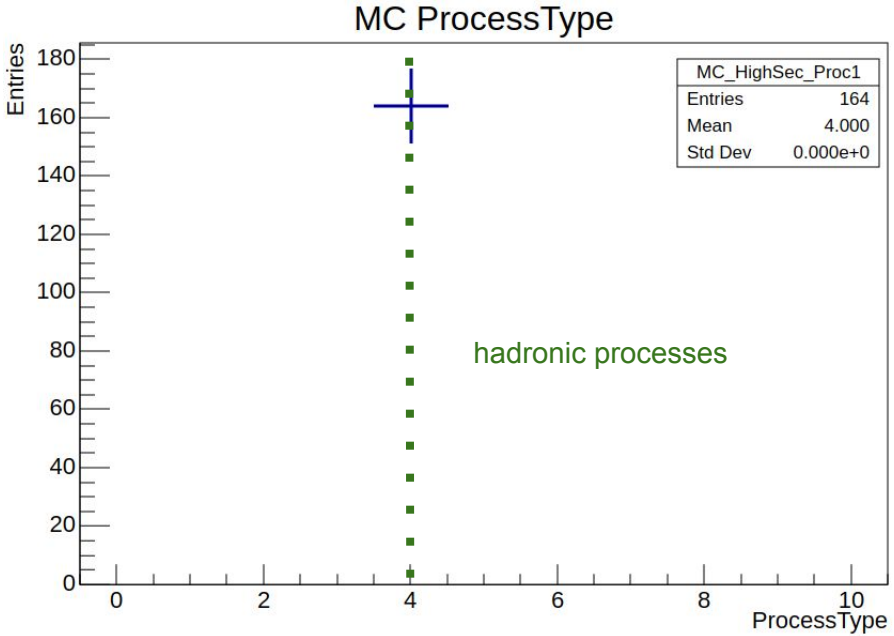
file **1683723255.00000001.root** with **NAIA v1.1_hotfix.**

NAIA v1.1.0



not-defined processes

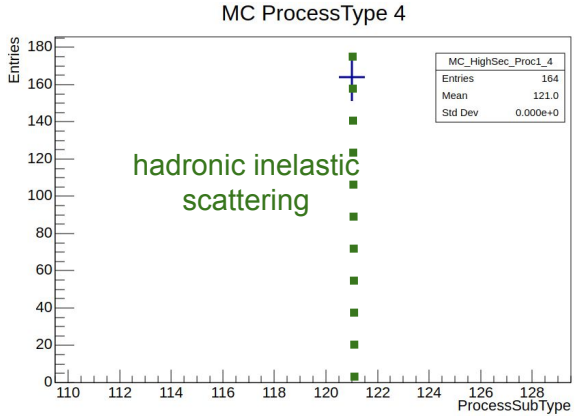
NAIA v1.1_hotfix

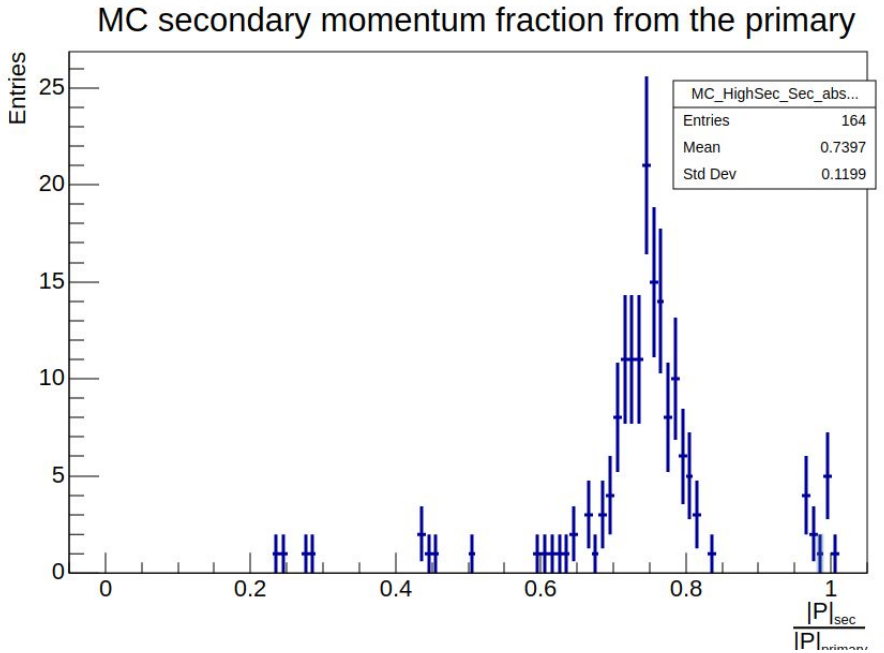


file **1683723255.00000001.root** with **NAIA v1.1_hotfix.**

Select charge 2 secondaries

Mainly hadronic inelastic products





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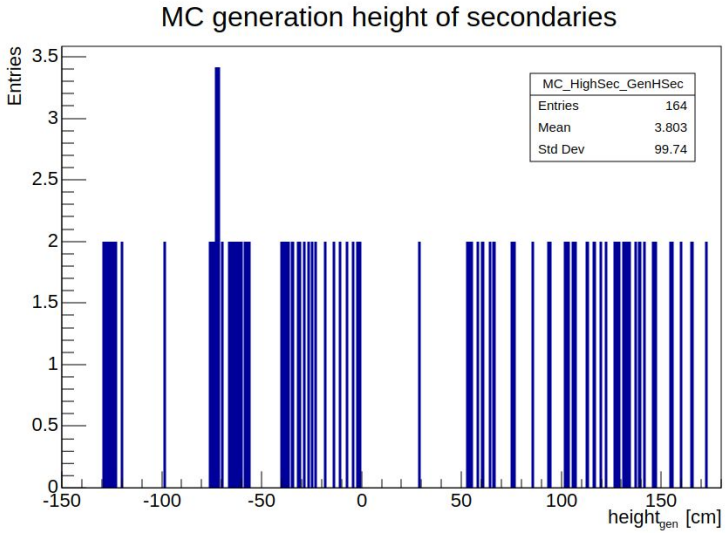
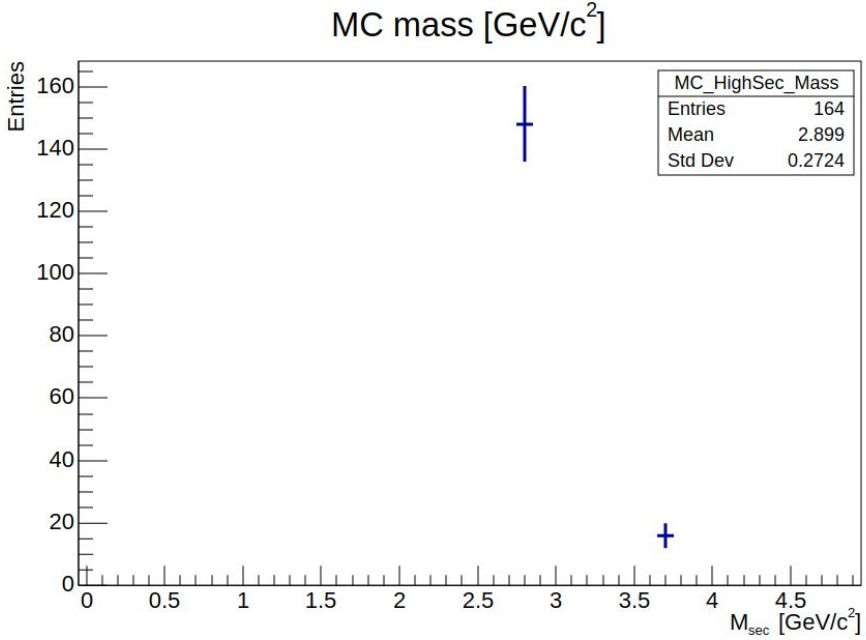
Select charge 2 secondaries





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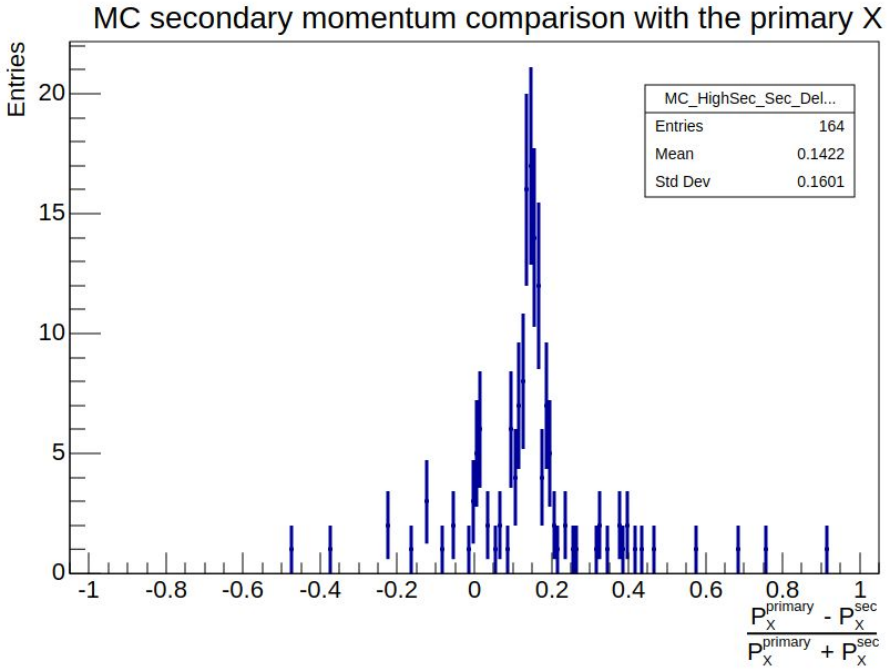
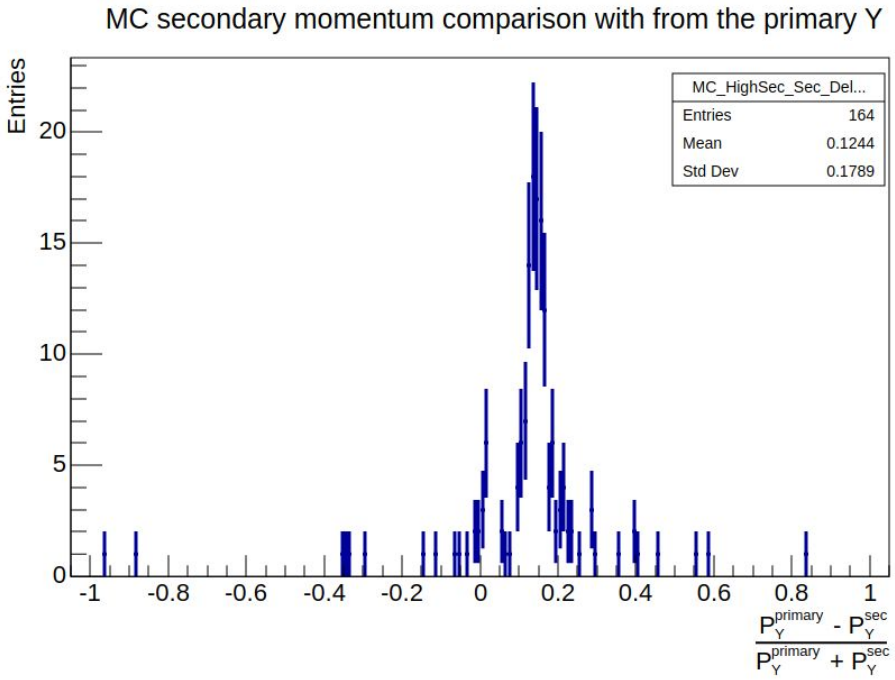
Select charge 2 secondaries





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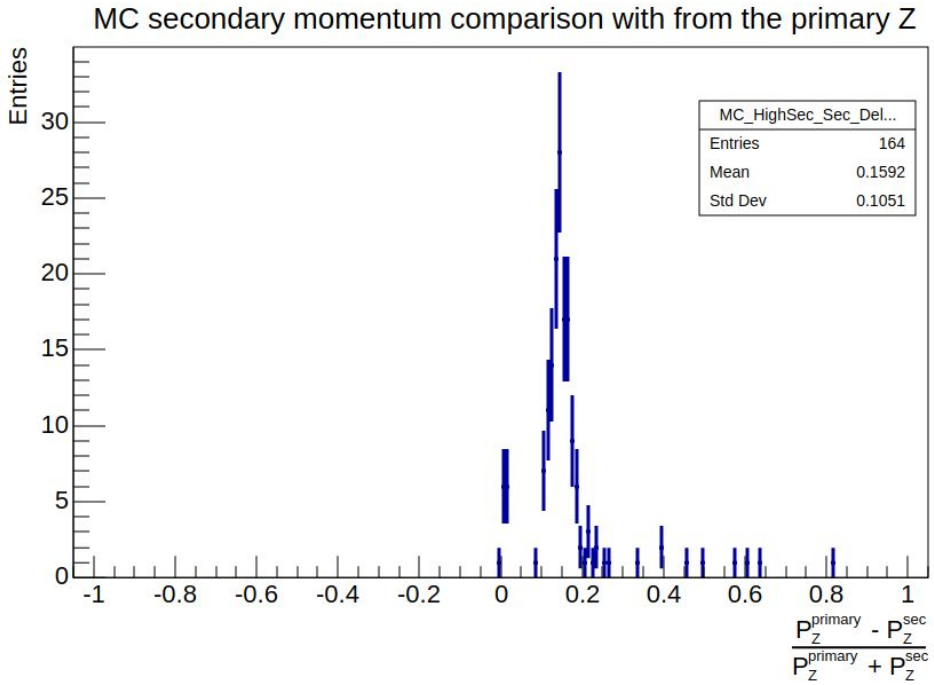
Select charge 2 secondaries



file **1683723255.00000001.root** with **NAIA v1.1_hotfix.**

Next step

- Increase statistics.
- Implement root PDGparticle class with nuclei PDG codes

file **1683723255.00000001.root** with **NAIA v1.1_hotfix.**