RICH Reconstruction: Rings fit and cuts

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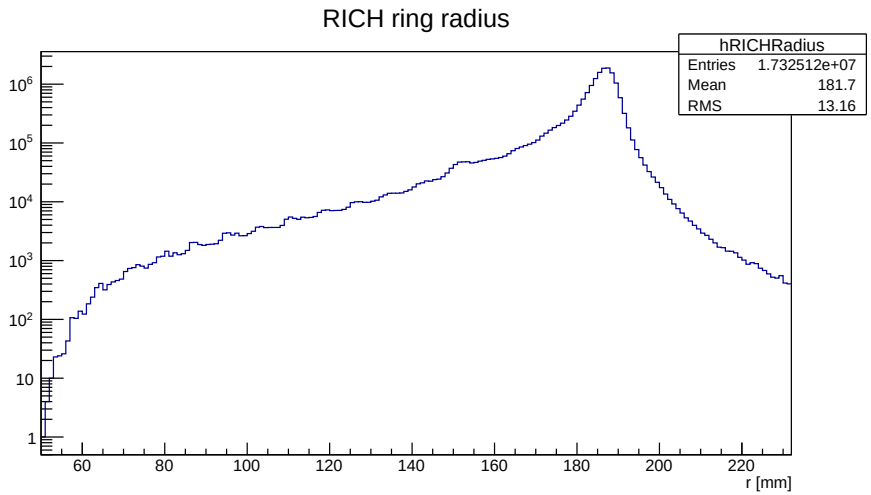
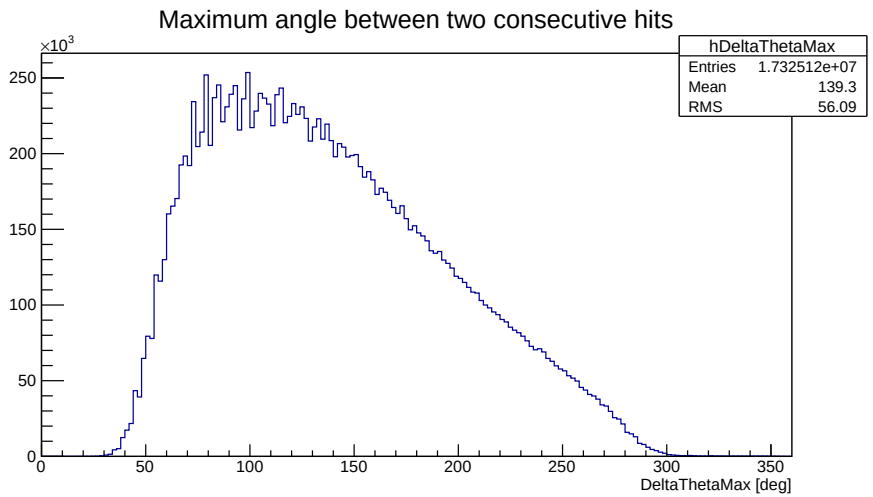
Radius discretization and angle between hits





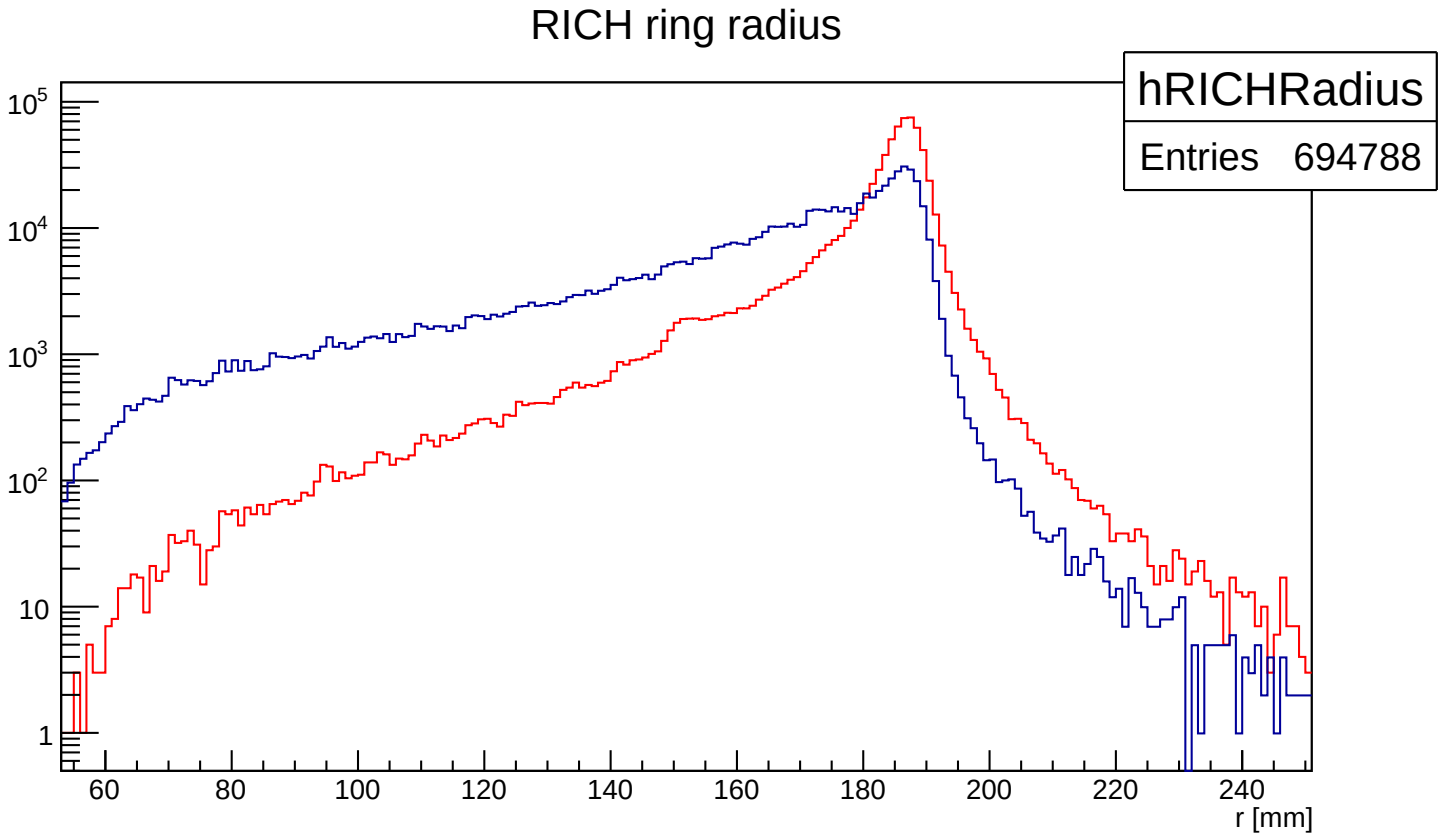
$step \simeq 9\ mm$ (PMT radius)

Hypothesis of a cut on $\Delta\Phi_{max}$

Run 6610, CONTROL Trigger, 1 RICH Ring Candidate requested

New idea for fit algorithm of rings

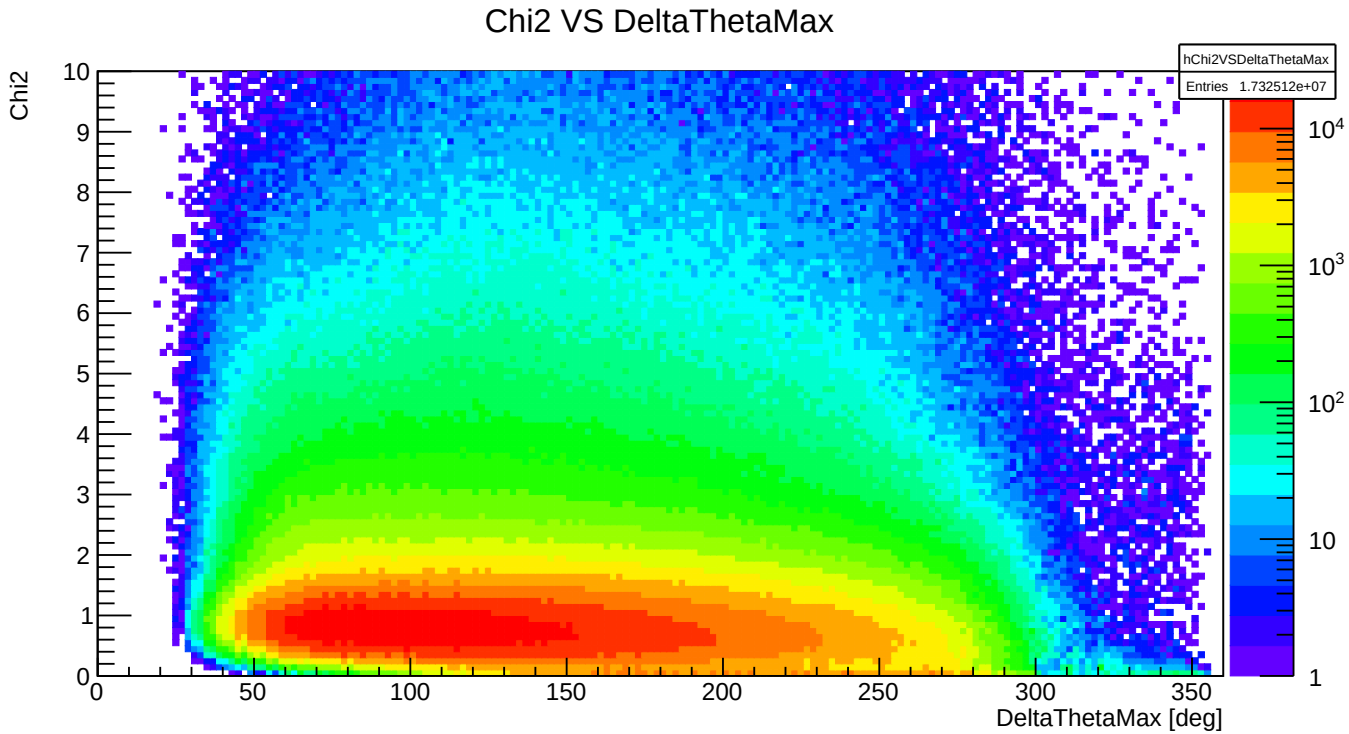
Maximizing the *string* instead of minimizing Δr: $s = 2\sqrt{r^2 - \Delta r^2}$



Difficulties on the fit algorithm definition and no any improvement.
Remaining at the current fit algorithm of rings.

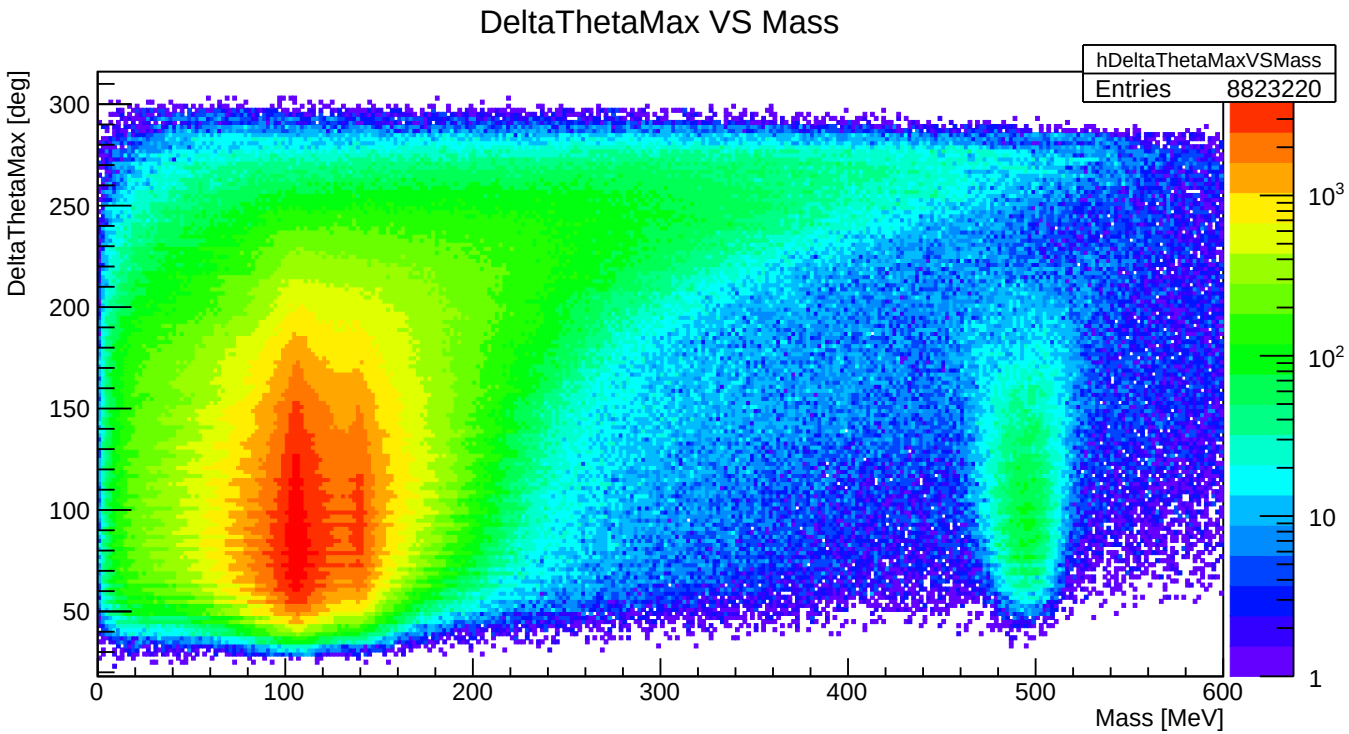
Cuts on the Rings Reconstruction

- Current cuts: $N_{hits} > 3$ in $\Delta t = \pm 2.5\ ns$;
- Idea n.1: applying stricter cuts using N_{hits} , $\Delta\Phi_{max}$, χ^2 (only RICH information)



Cuts on the Rings Reconstruction

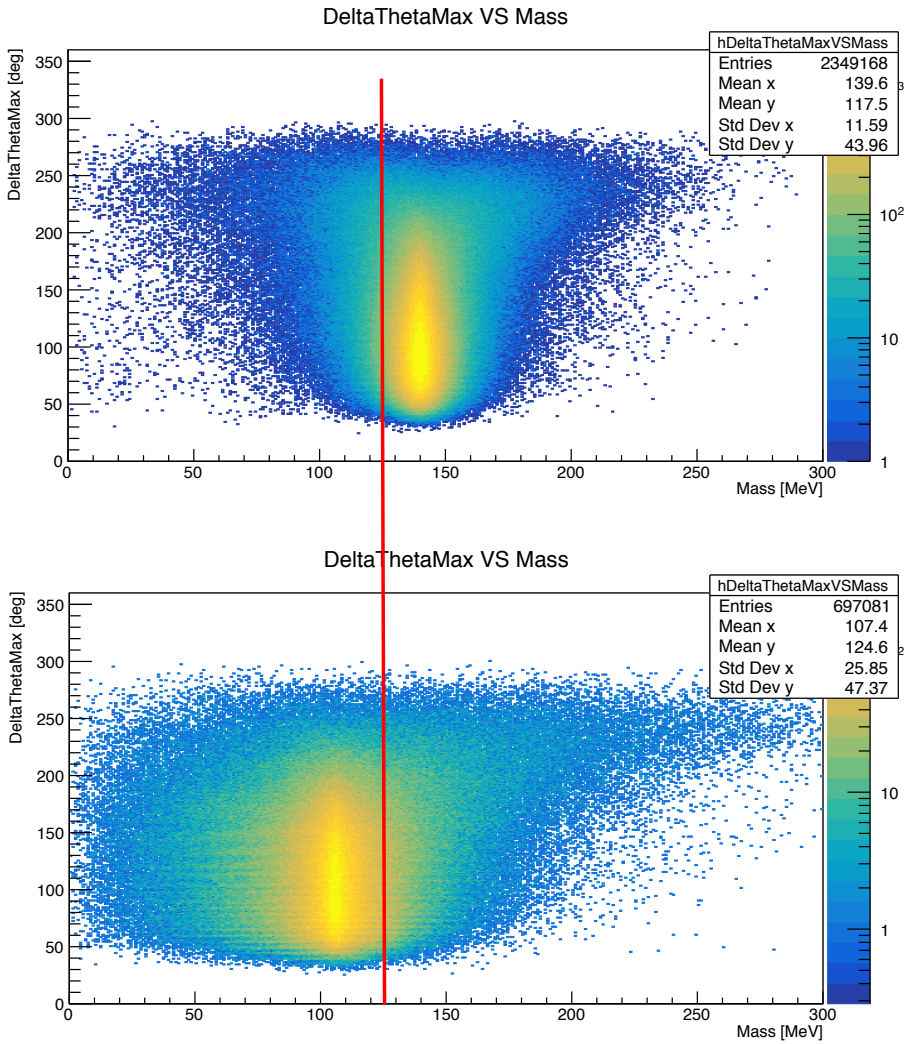
- Idea n.2: applying cuts using also STRAW information, e.g. the charged particle mass as function of the RICH radius and the Spectrometer momentum



$$m = m(p, R) = p \cdot \sqrt{\frac{F^2 \cdot n^2}{F^2 + R^2} - 1}\,, \; n = 1.000062\,, \; F = 17020\; mm$$

Cuts on the Rings Reconstruction

Pions and muons selections



Conclusions

Proposals for improvements on rings reconstruction:

- hadding several cuts on RICH physics quantities (e.g. $\Delta\Phi_{max}$, χ^2). $\rightarrow$ No bias, bad performances.
- cutting also on quantities coming from STRAW (e.g. $m = m(p, R)$). $\rightarrow$ No complete independent measurements from RICH.
- estrapolating the ring center with STRAW track and fitting only the radius. $\rightarrow$ Better performances, bias to by studied.