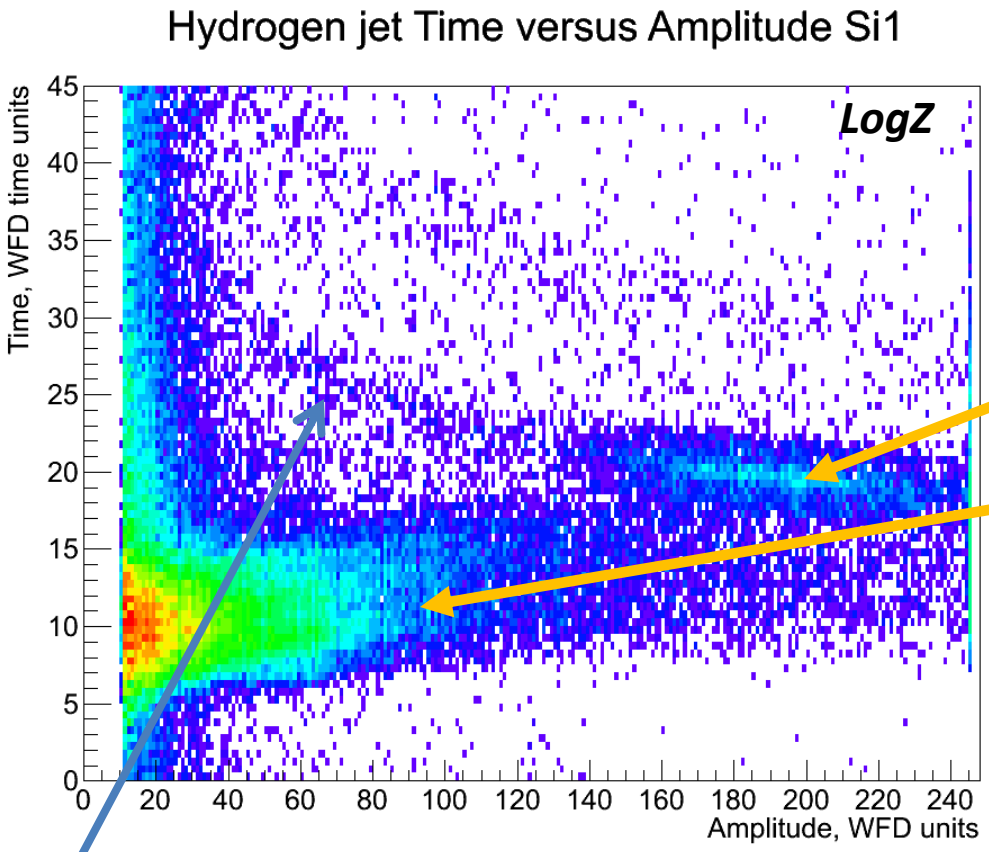
A. Poblaguev

What do we detect in the H-Jet ?

A superficial view

Run x1903.902

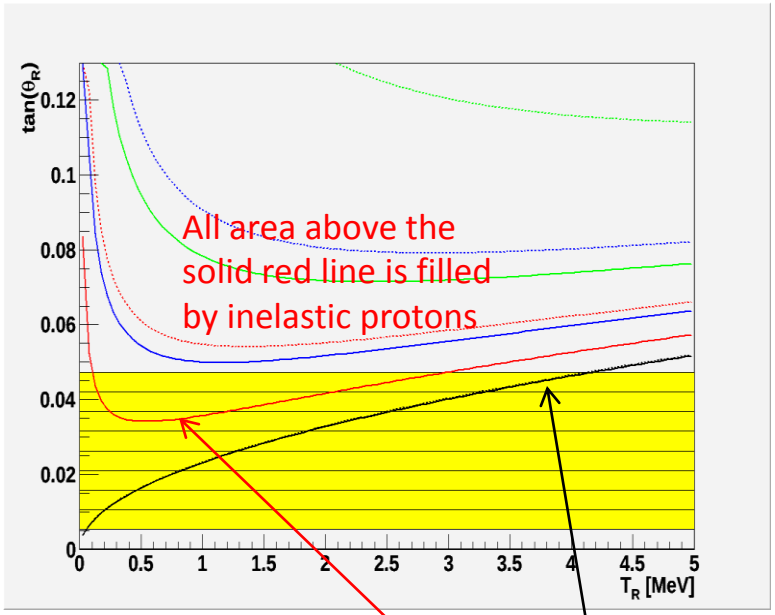


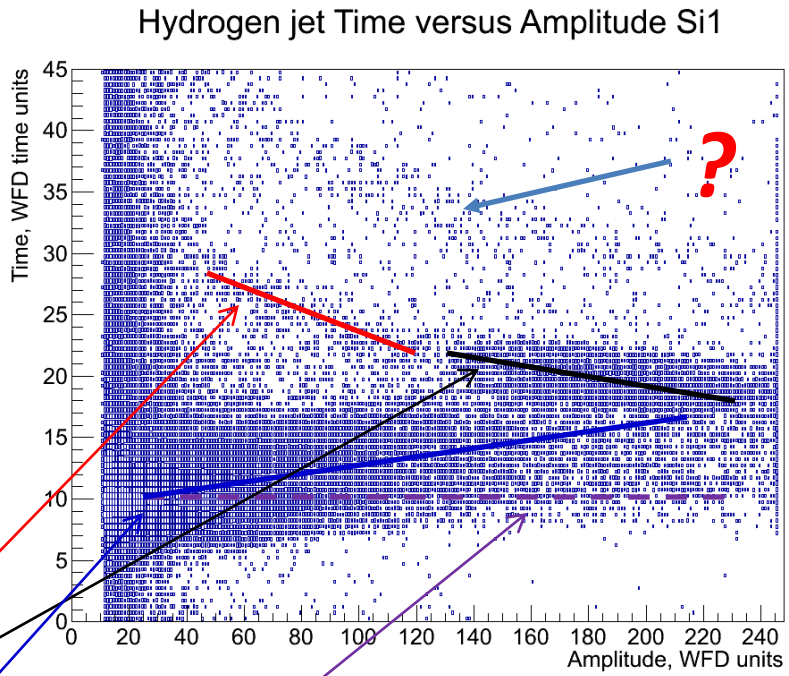
Elastic Protons

"Prompts"

- ***Inelastic protons ?***
- ***Why prompts have larger width (time) than protons ?***

What do we expect to see ?



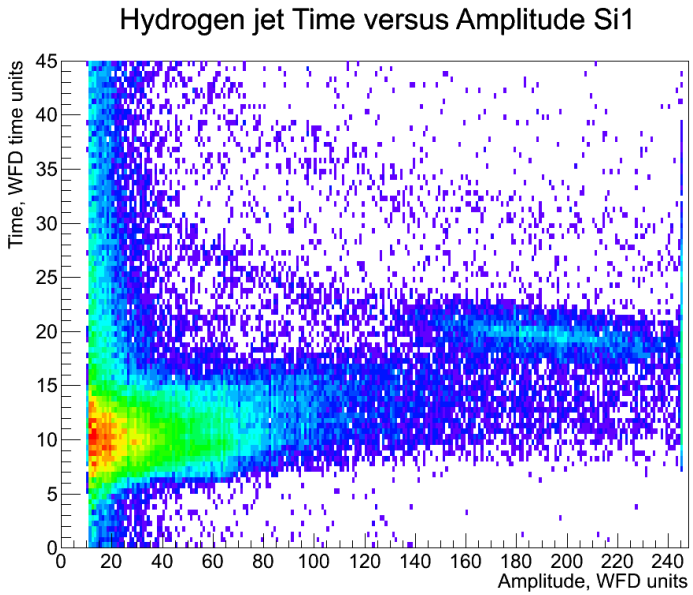


- ***Elastic protons***
- ***Inelastic protons***
- ***Prompt pions***
- ***Prompt photons***

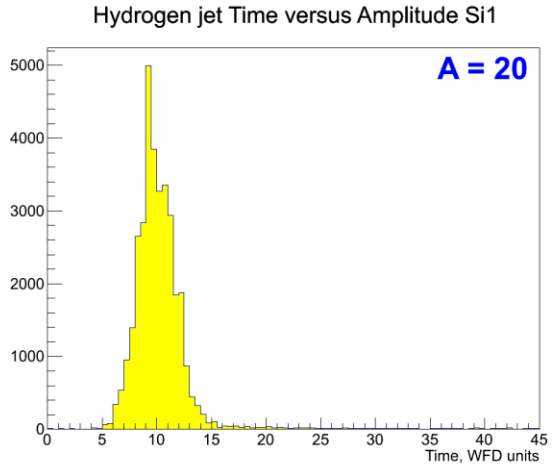
$$pp \rightarrow pp$$
$$pp \rightarrow pp\pi$$
$$pp \rightarrow pn\pi^{+}$$
$$pp \rightarrow pp\pi^{0} \rightarrow pp\gamma\gamma$$

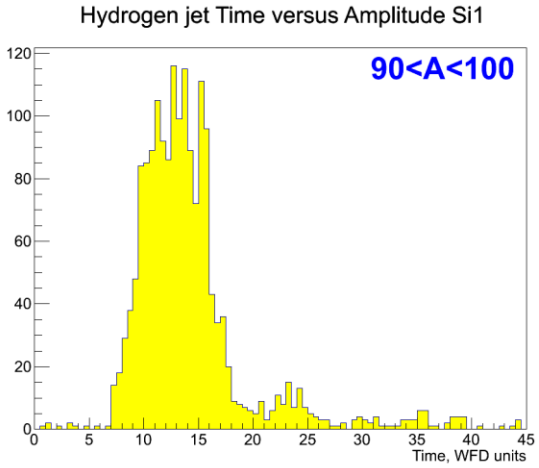
- ***Energy range of elastic protons is defined by strip geometry.***
- ***Inelastic protons could be seen only in 2 strips.***
- ***Inelastic protons have lower energy (in the same strip)***
- ***No protons in the prompts***

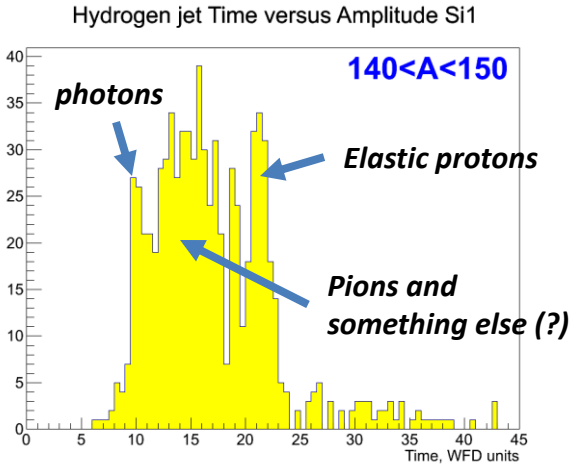
Do we see pions and/or photons ?



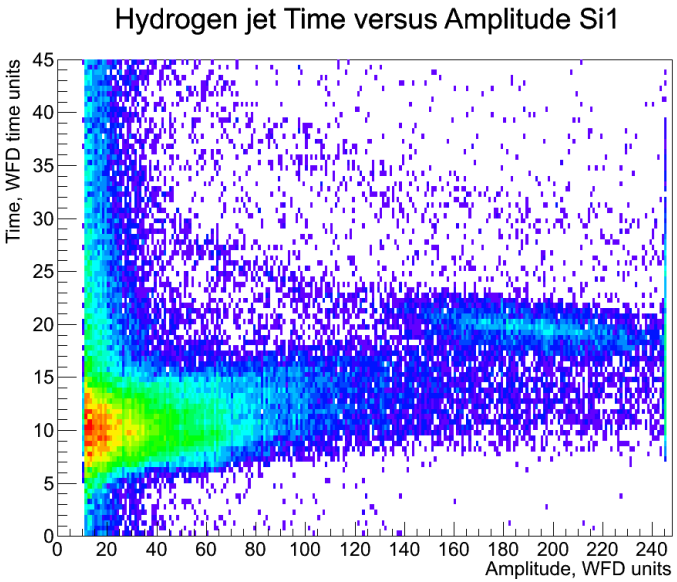
- Prompt width at A=20 (minimum ionizing particles and photons) is about the same as elastic proton width
- At larger amplitudes promt start to split into photons and pions.
- Third component is not excluded.

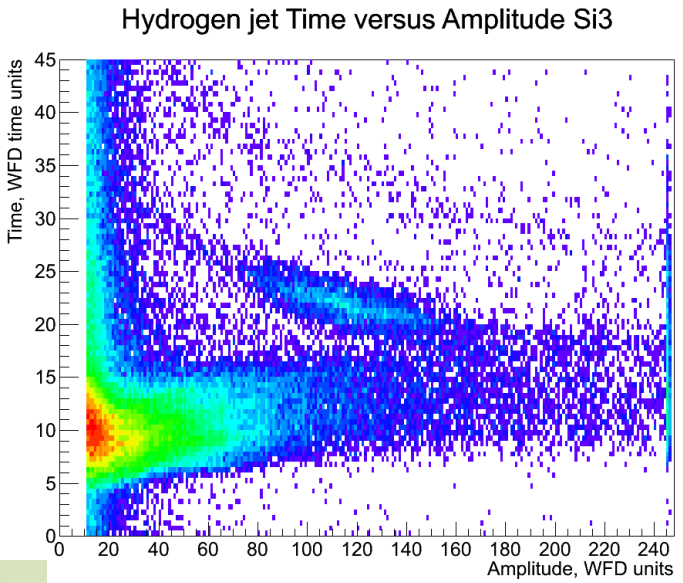




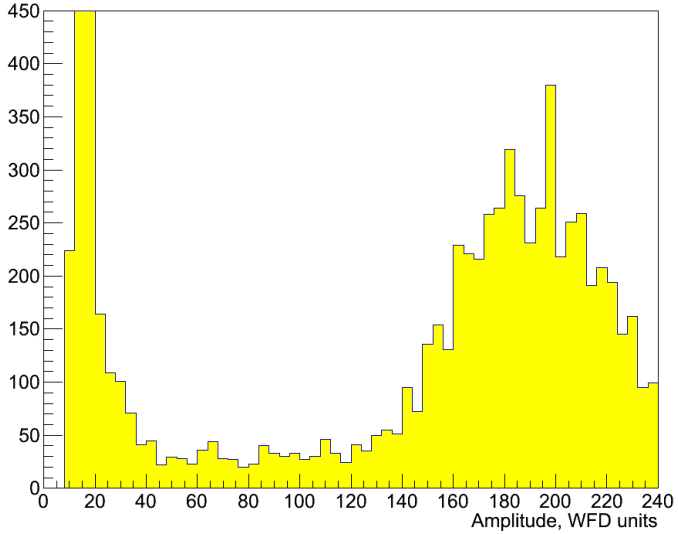


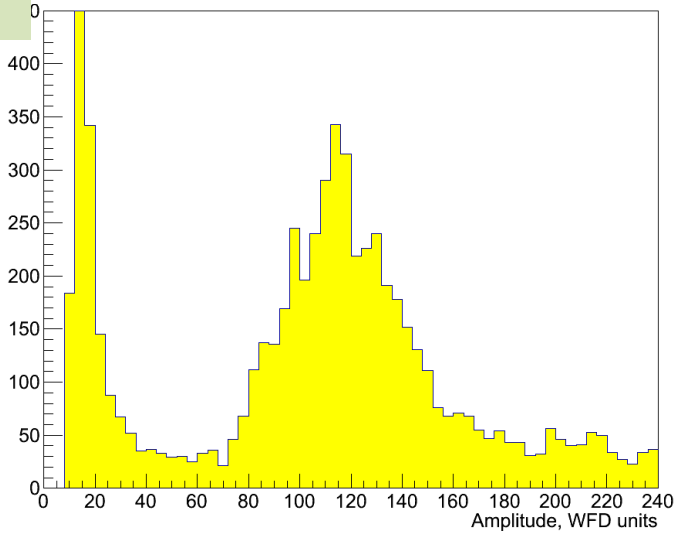
Nonelastic protons (low energy)





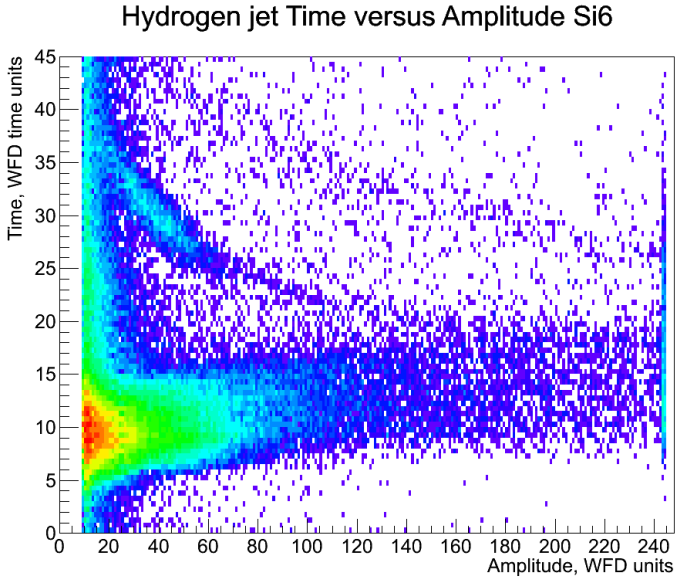
Cut: $|t - t_p| < 3$

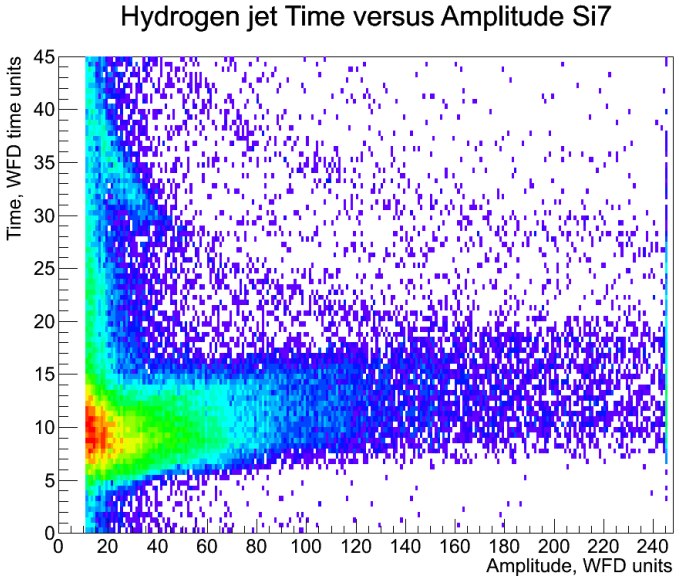


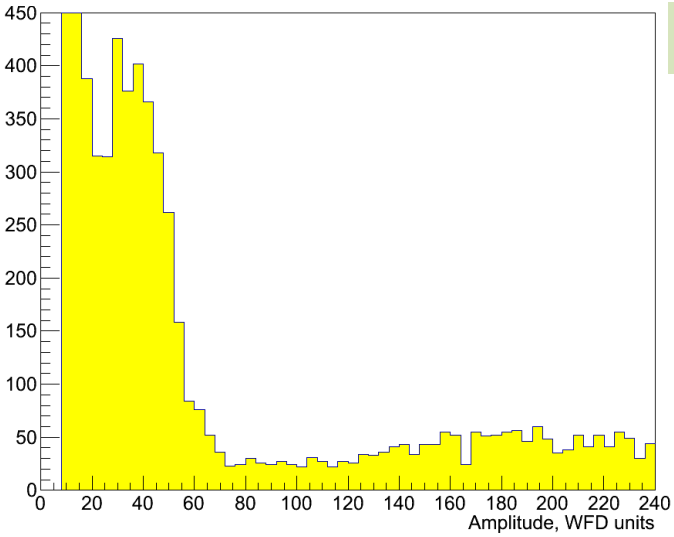


Non *pp* protons are observed. (5-10 % level)

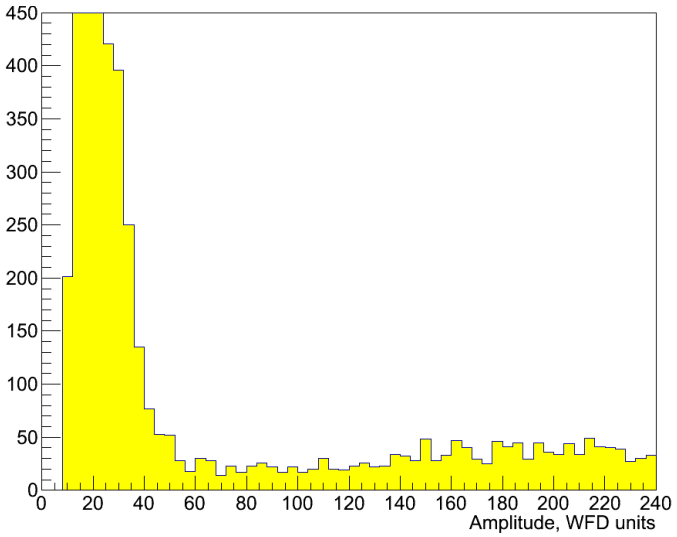
Nonelastic protons (high energy)







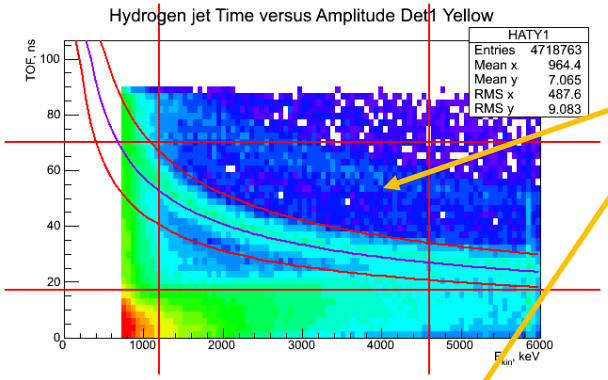
Cut: $|t - t_p| < 3$

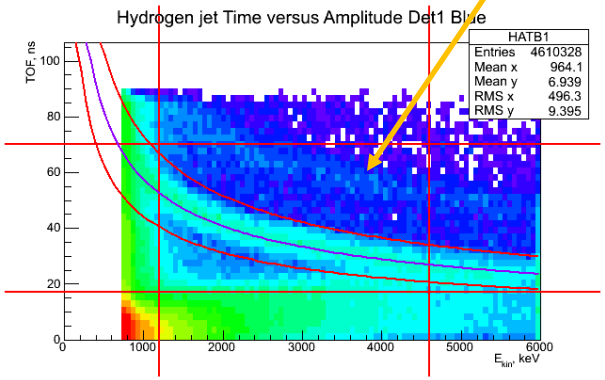


Non *pp* protons are observed. (5-10% level)

Helium signal

Yellow/Blue sum (Det 1)

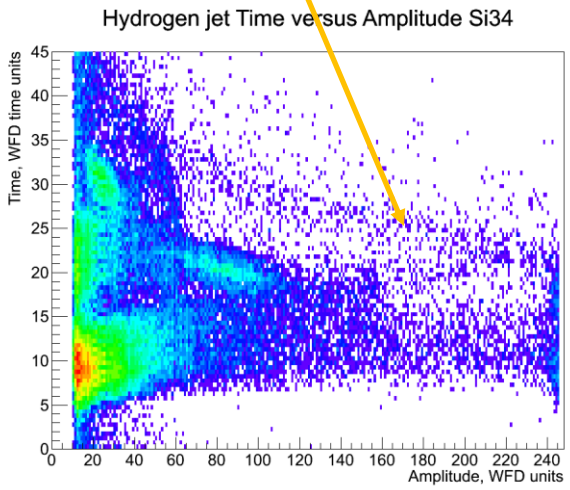


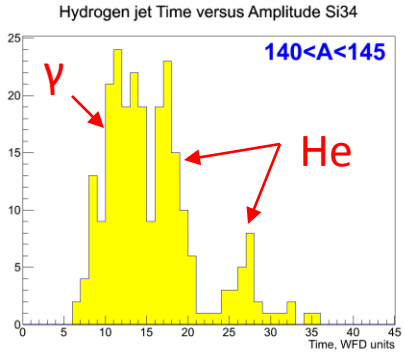


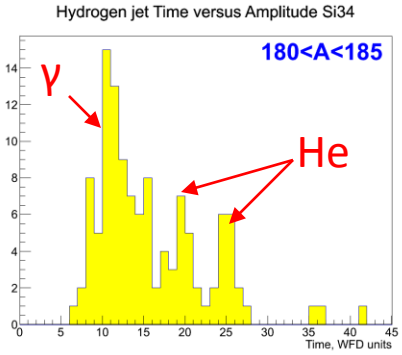
Besides proton banana, there is a banana with larger mass:

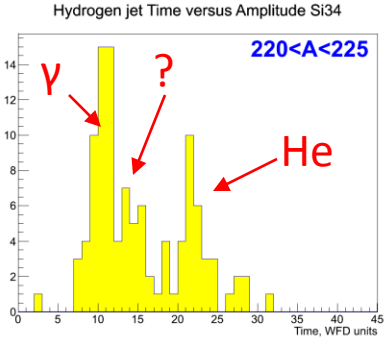
M = (3-4)×M_p **(^{4}He, ^{3}He, ~~^{3}H~~)**

Strip (#34) with reduced gain





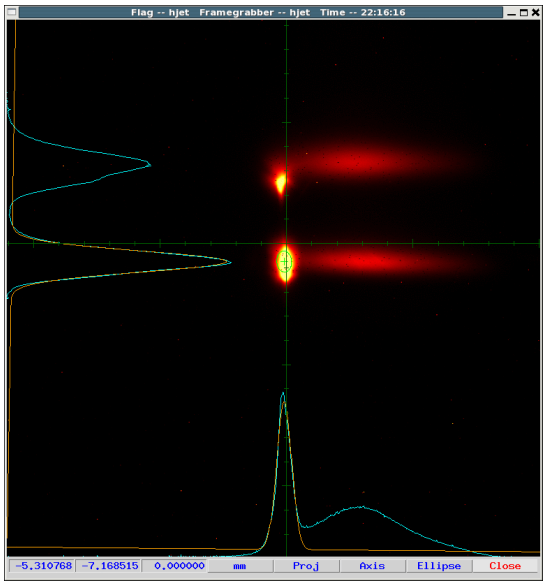


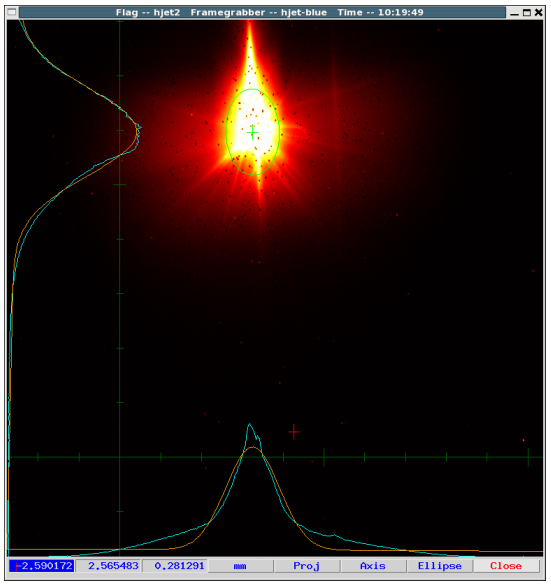


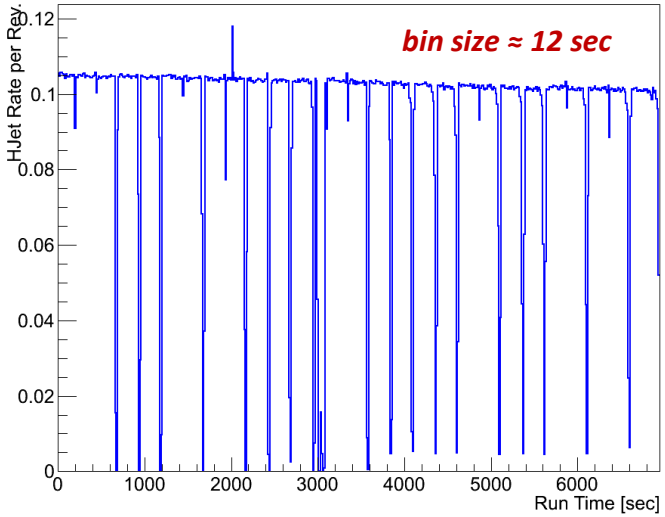
- We do see (inelastic) Helium signals in the H-Jet
- Punch through He may contribute to the prompt
- Where does He come from ?
- Heavier nucleus must be in the jet (this is consistent with observations

Macroparticles from the nozzle

Ocasionally, macroparticles from the nozzle go through the beam.



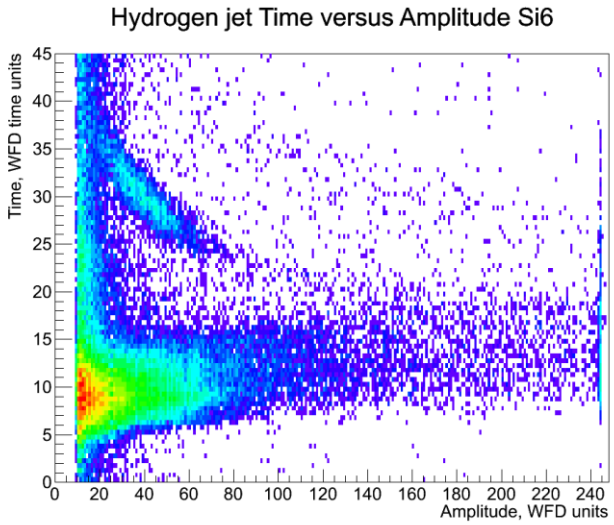


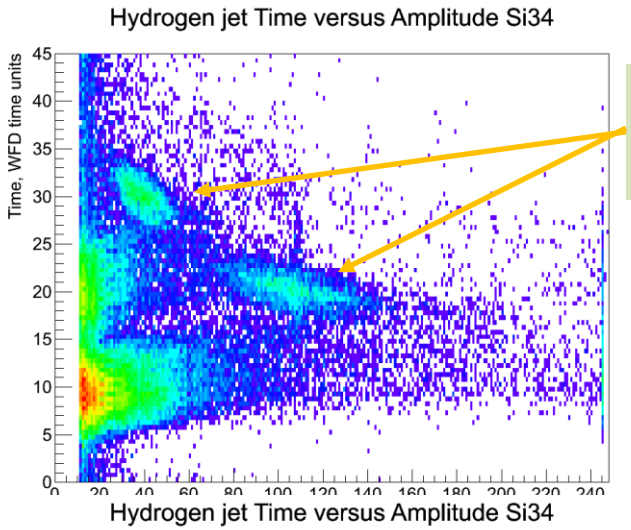


- **At a first glance, macroparticles can not explain He and non *pp* proton signals.**
- **Definitely, more study is needed to make a conclusion**

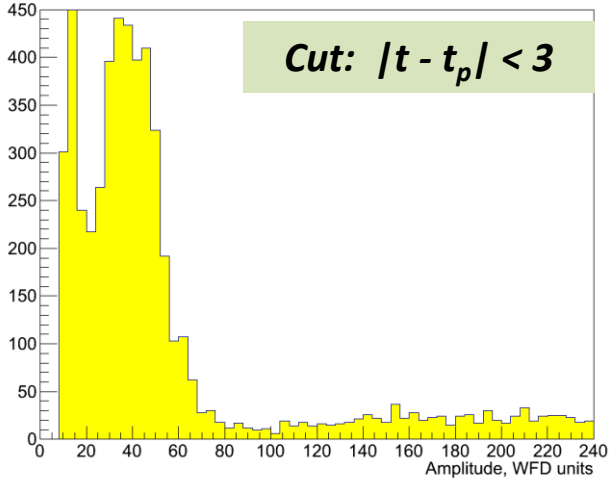
Another Run x2503.903

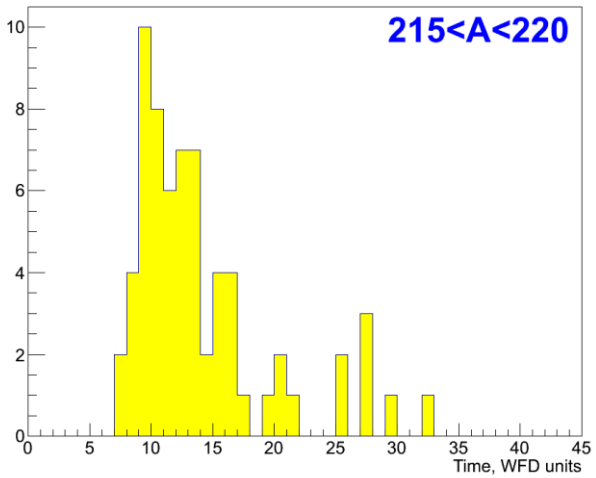
- Better pumping
- Cleaner nozzle





Something wrong in the strip #34, except for the gain.





The problem was reduced by a factor 2-3, but it is still there.

Very preliminary summary

- **In the Hjet, we do detect He and protons from the *pA* interaction ($M_A > 4M_p$).**
- **The selected "elastic protons" contain up to 5-10% pA protons**
- **pA protons may affect differently on jet and beam asymmetries.**
- **This may be a very important source of the systematic errors (up to 5-10% !).**
- **More accurate study is necessary.**