

fiTQun reference performance : e / pi0

- Require $> 85\%$ of total charge to be in the barrel
- 10,000 events from varyAll samples:
- Compare performance of 3 selections in bins of energy:
 - 1: $f_{\text{qpi0mass}} > 50 \text{ MeV}$
 - 2: $dLL > 200$
 - 3: $dLL/400 + f_{\text{qpi0mass}}/100 > 1$.
- Code is here: “UVicWorkshopPlayground/F/dean/fitQunStudy.ipynb”

fiTQun likelihood ratio

Red: pi0
Blue: electrons

Total pi0: 308
Pass cut: 266

Total e : 710
Pass cut: 17

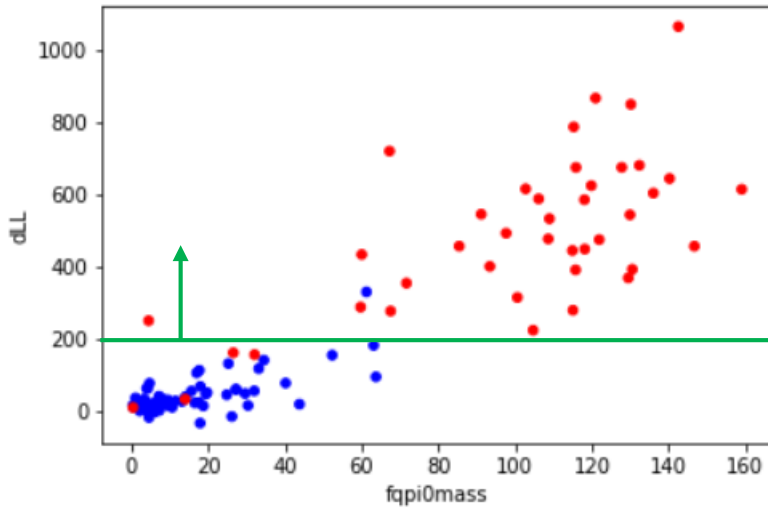
Total pi0: 819
Pass cut: 641

Total e : 786
Pass cut: 77

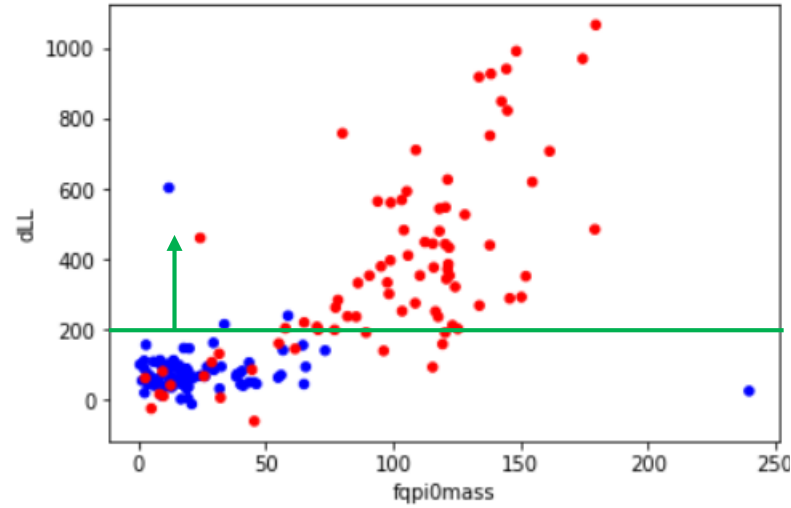
Total pi0: 834
Pass cut: 623

Total e : 831
Pass cut: 179

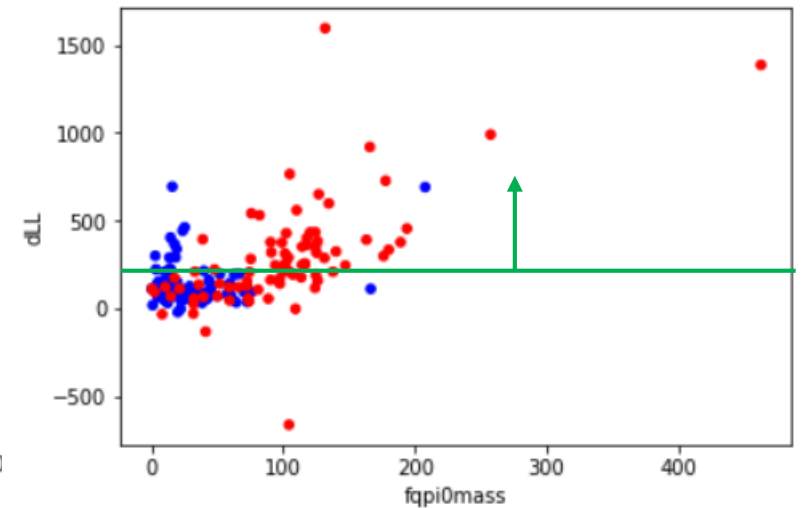
0.0 < E < 300.0 MeV



300.0 < E < 600.0 MeV



600.0 < E < 900.0 MeV



fiTQun pi0 mass

Total pi0: 308

Pass cut: 267

Total e : 710

Pass cut: 10

Total pi0: 819

Pass cut: 570

Total e : 786

Pass cut: 43

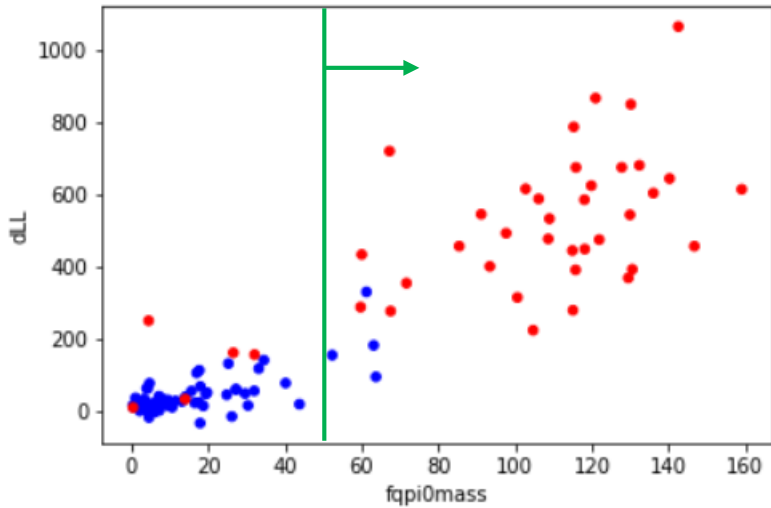
Total pi0: 834

Pass cut: 474

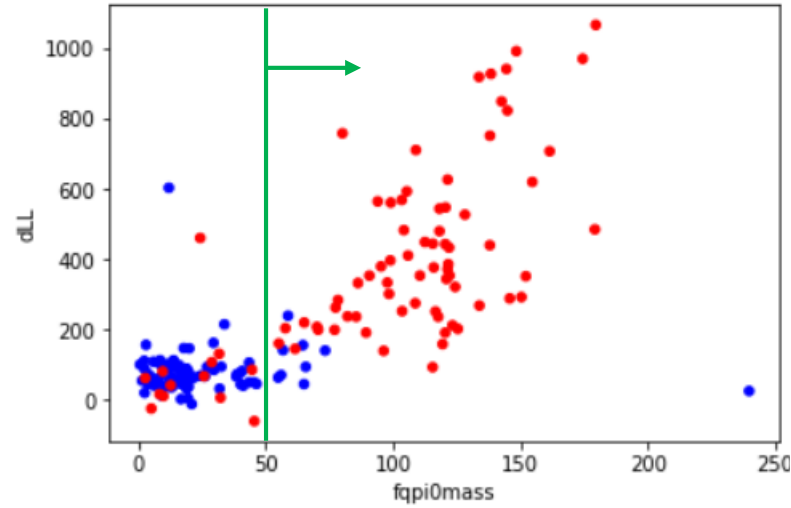
Total e : 831

Pass cut: 111

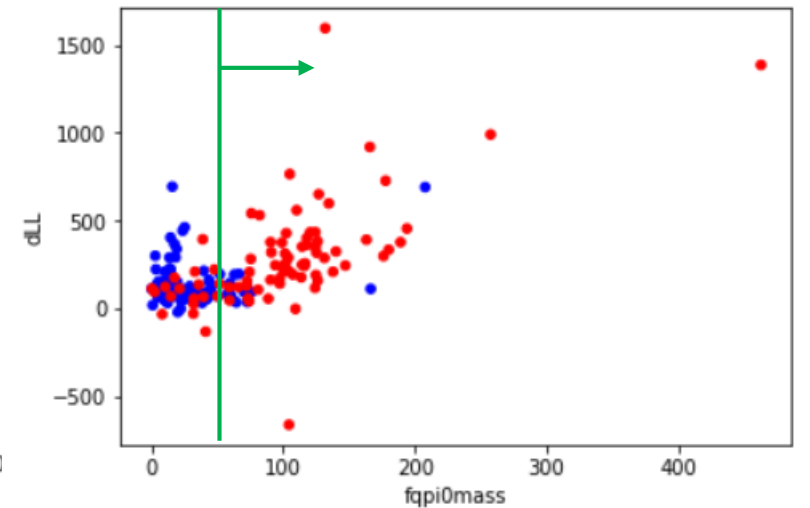
0.0 < E < 300.0 MeV



300.0 < E < 600.0 MeV



600.0 < E < 900.0 MeV



fiTQun likelihood ratio and pi0 mass

Total pi0: 308

Pass cut: 267

Total e : 710

Pass cut: 7

Total pi0: 819

Pass cut: 638

Total e : 786

Pass cut: 34

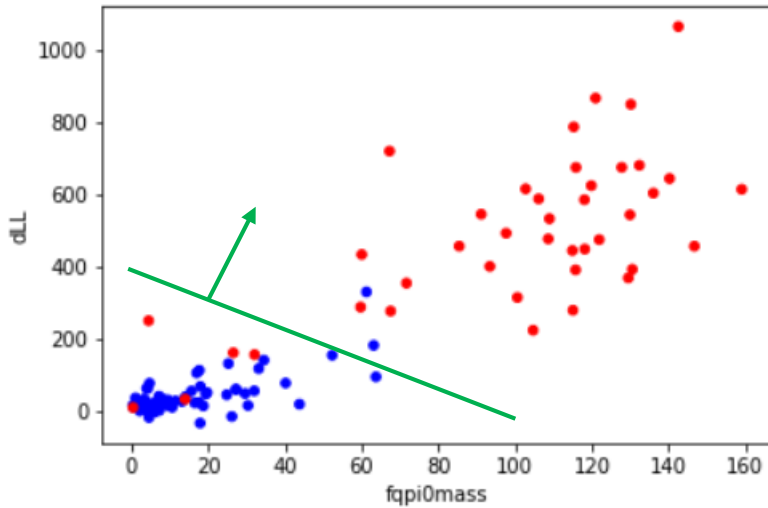
Total pi0: 834

Pass cut: 599

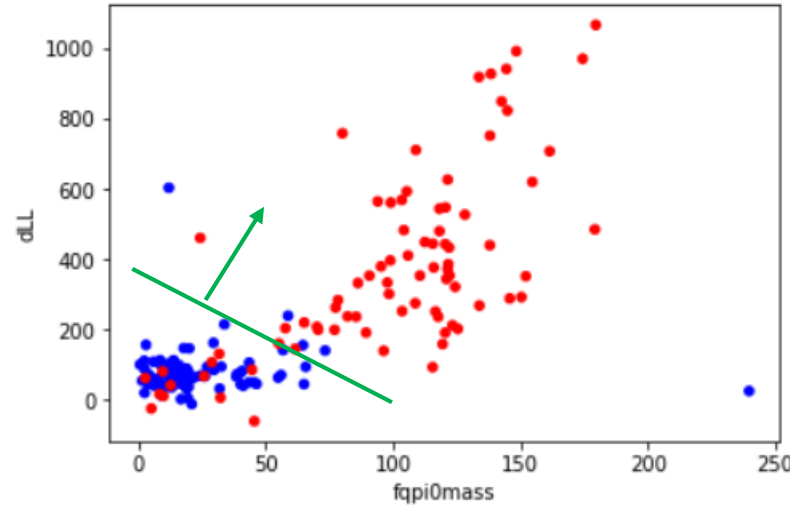
Total e : 831

Pass cut: 112

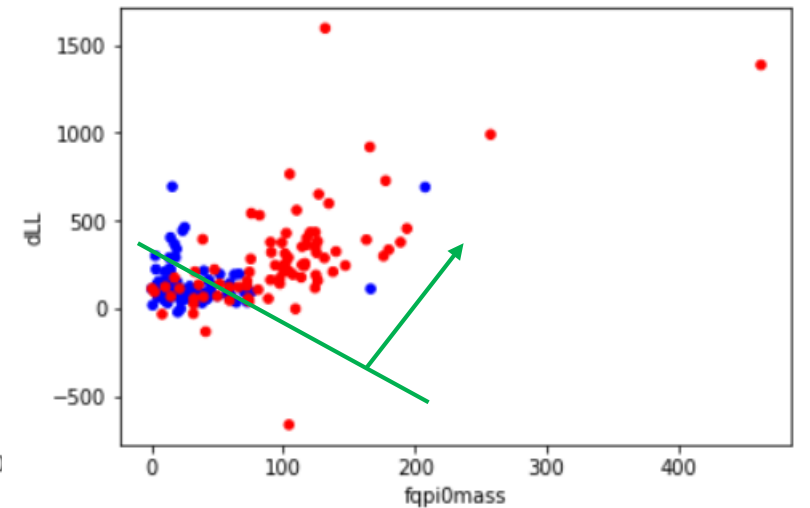
0.0 < E < 300.0 MeV



300.0 < E < 600.0 MeV



600.0 < E < 900.0 MeV



Conclusions

- CNN needs much more work to approach the well defined fiTQun (likelihood based) analysis
- A good challenge with a well defined goal!