

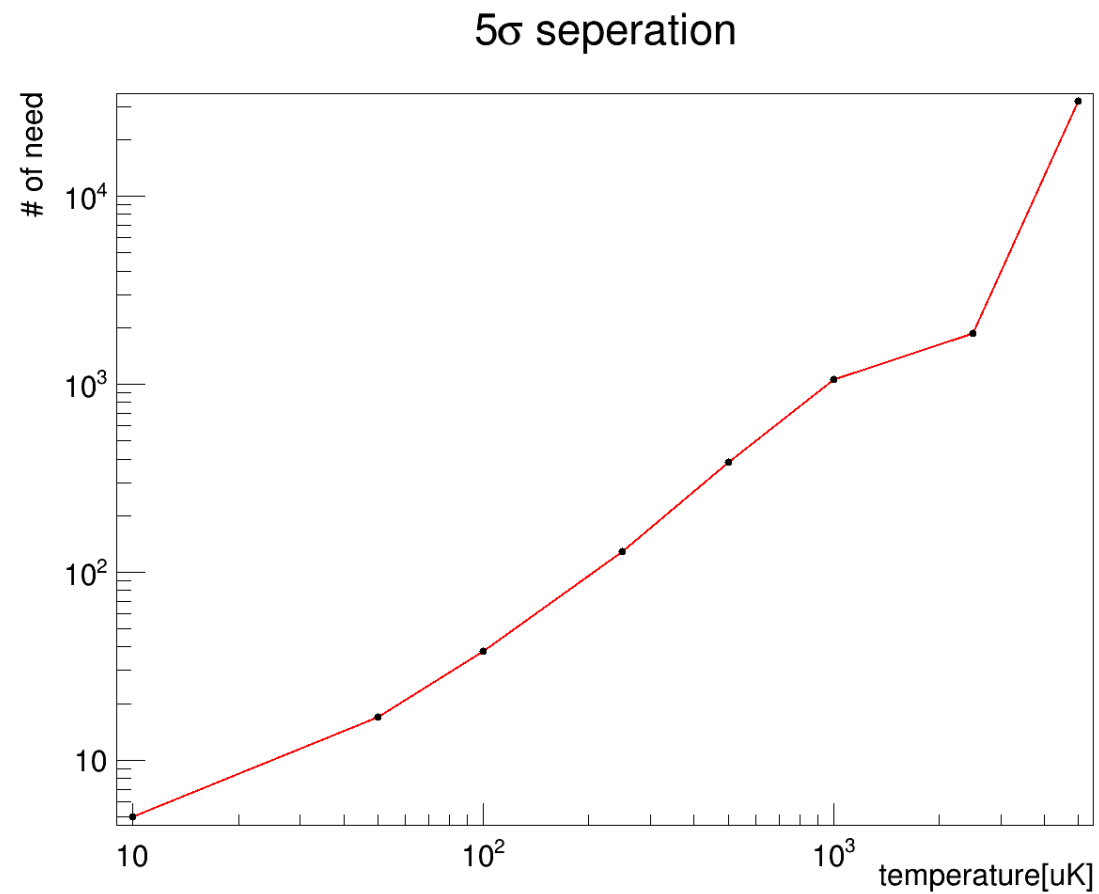
5 sigma separation

- Find minimum # of events need for 5 sigma separation

- $$\frac{|LR_{mean.up} - LR_{mean.dw}|}{\sqrt{\sigma_{dw}^2 + \sigma_{up}^2}} \geq 5$$

- Assuming one experiment takes 2 minutes.
- Assuming only 20 % of experiments pass the trigger selection

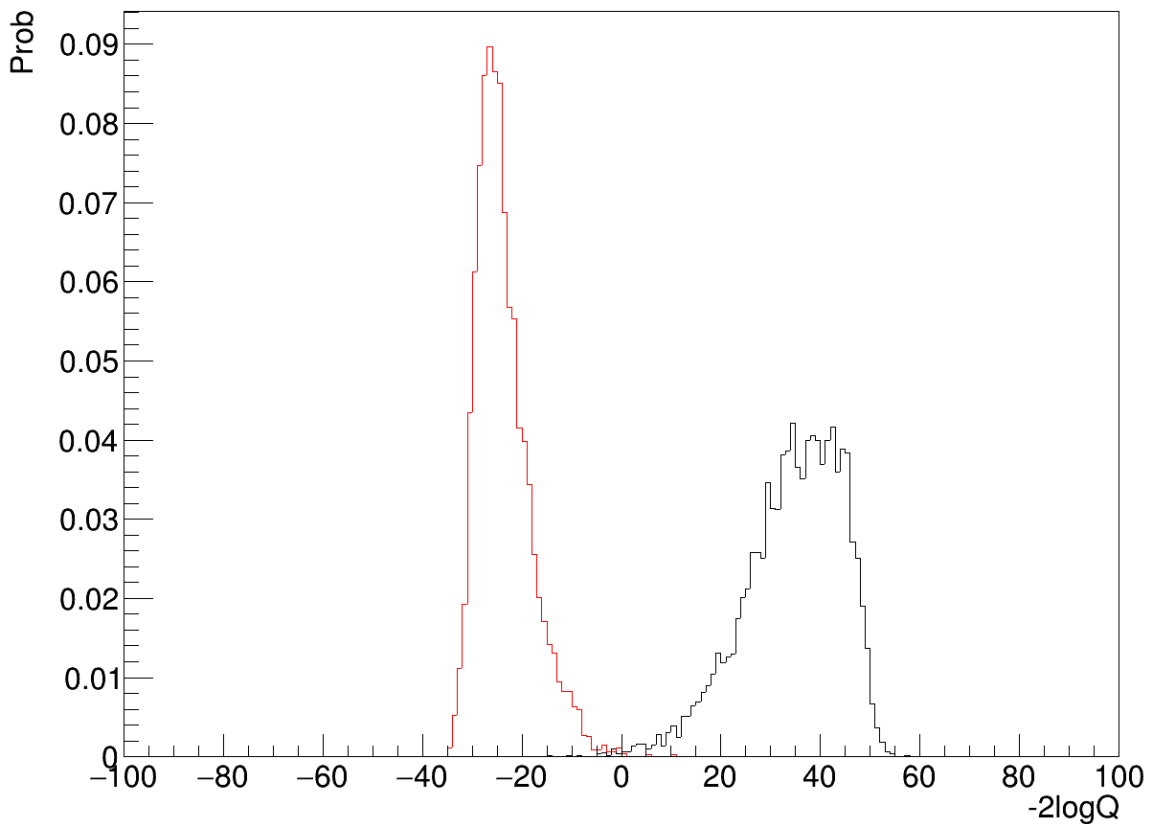
5 sigma separation



5 sigma separation

- $10\mu\text{K} : 5/0.2 * 2 \text{ min} = 50 \text{ min}$

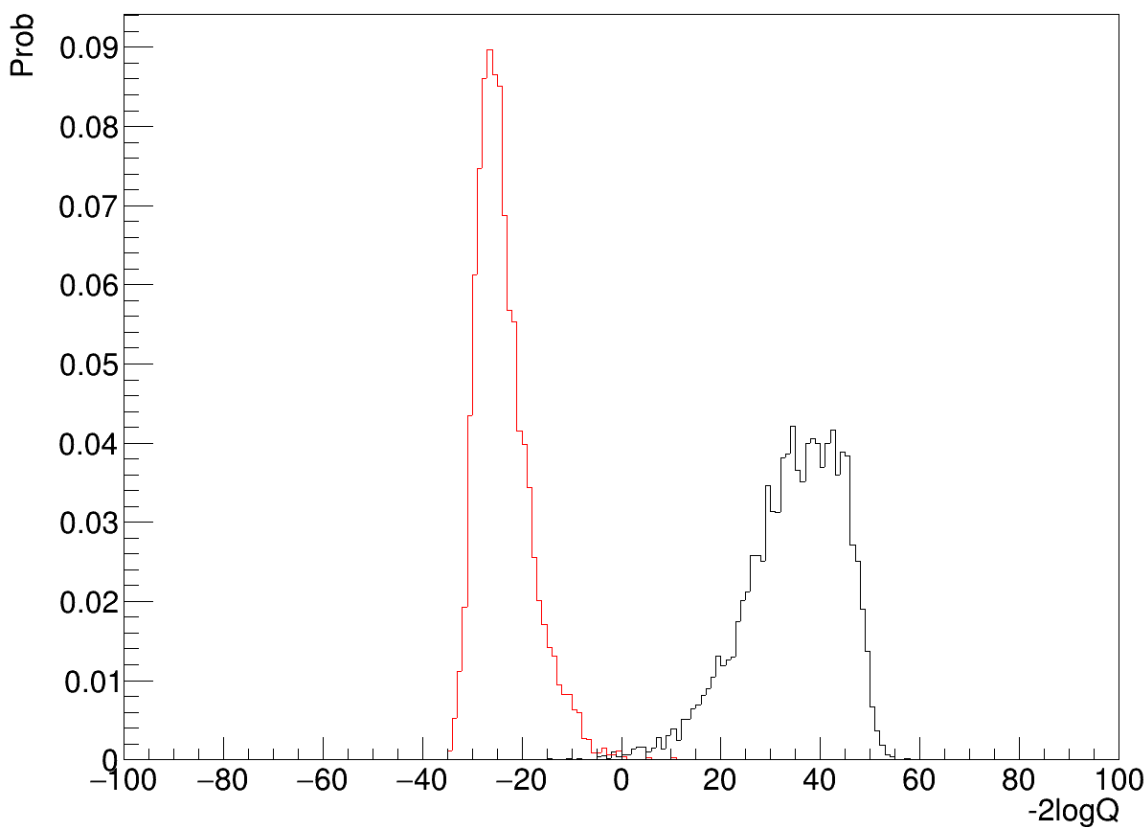
Likelihood ratio with 5 events at 10uK



5 sigma separation

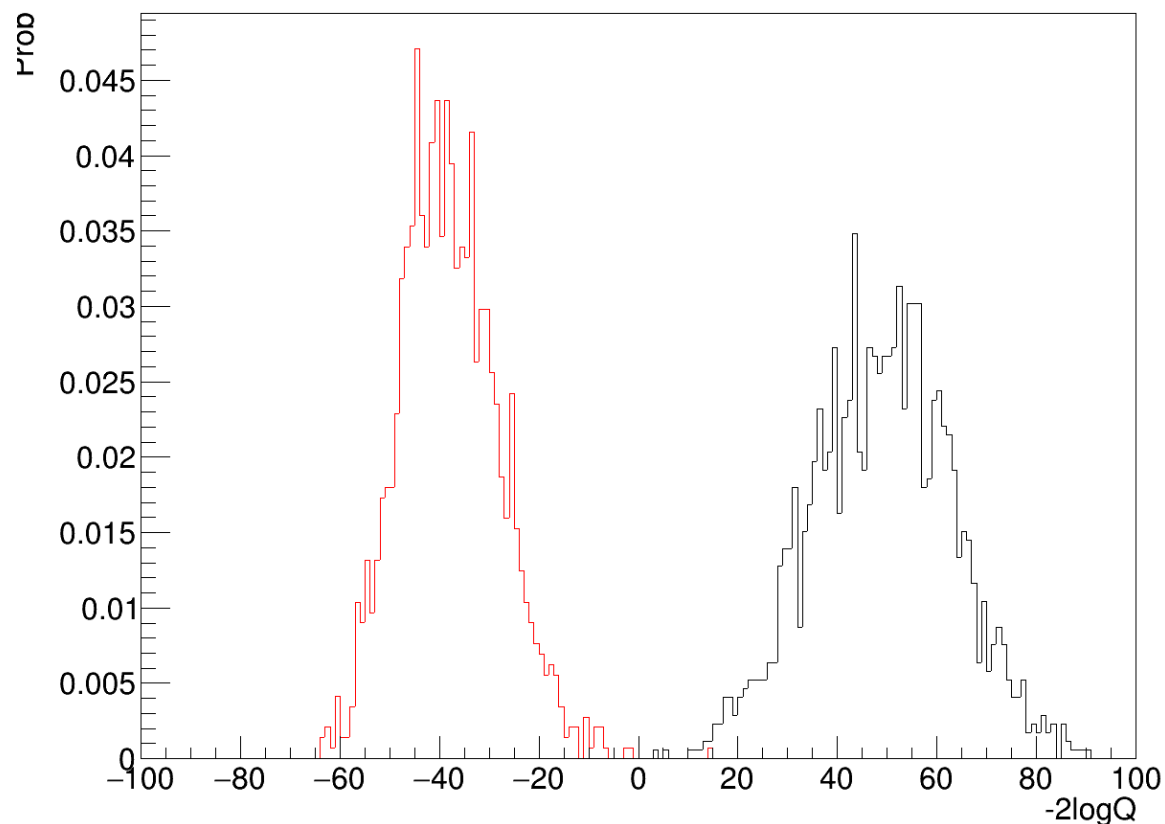
- 10uK : $5/0.2 * 2 \text{ min} = 50 \text{ min}$

Likelihood ratio with 5 events at 10uK



- 50uK: $17/0.2 * 2 \text{ min} = 170 \text{ min}$

Likelihood ratio with 17 events at 50uK

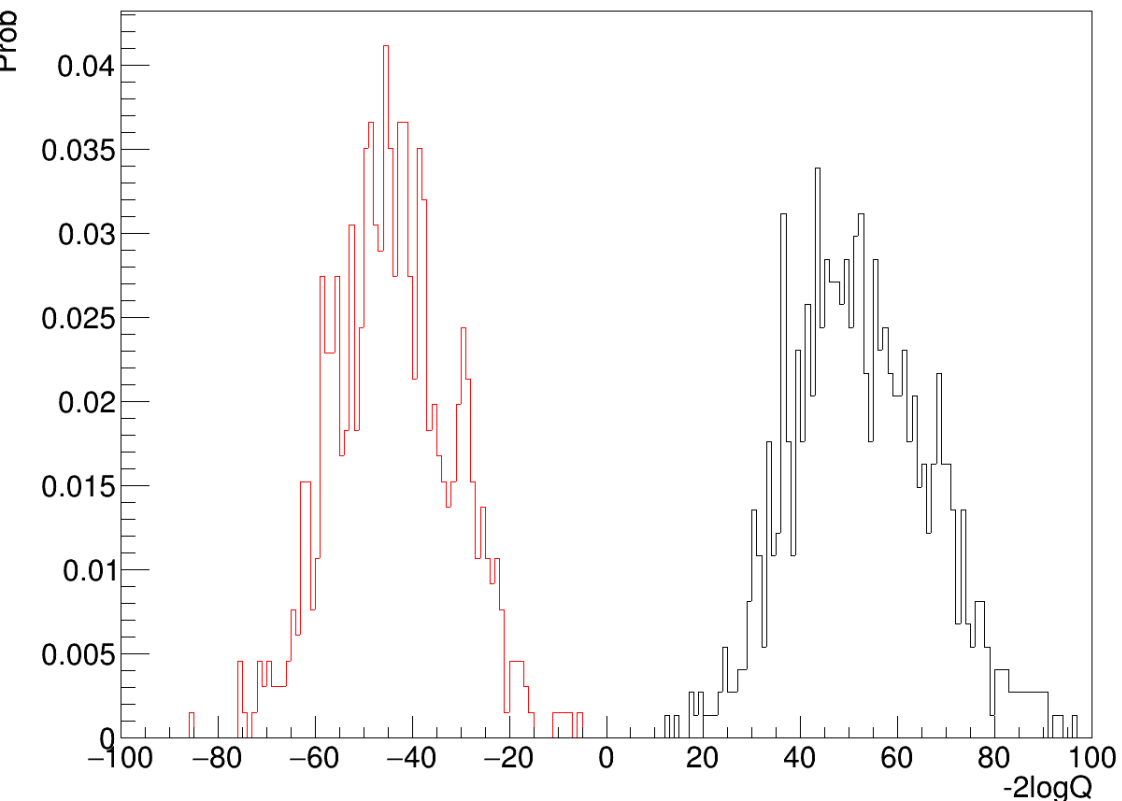


5 sigma separation

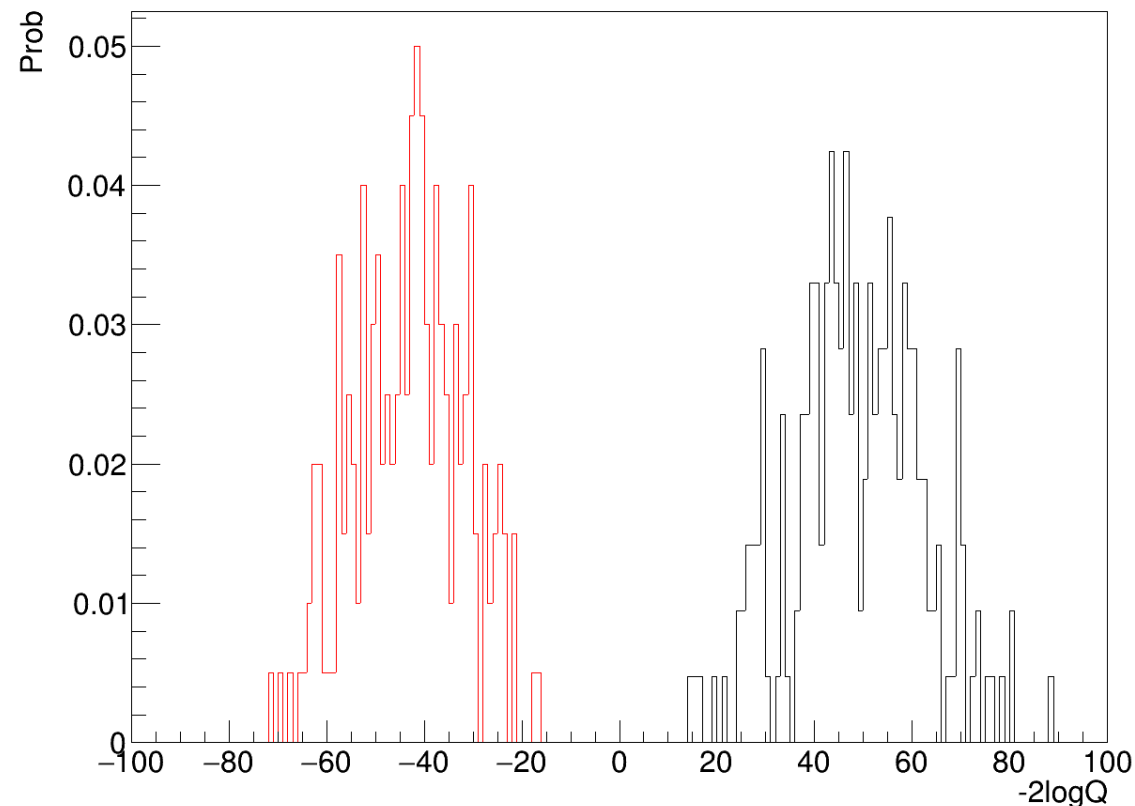
- 100uK : $38/0.2 * 2 \text{ min} = 6 \text{ h}$

- 250uK: $129/0.2 * 2 \text{ min} = 22 \text{ h}$

Likelihood ratio with 38 events at 100uK



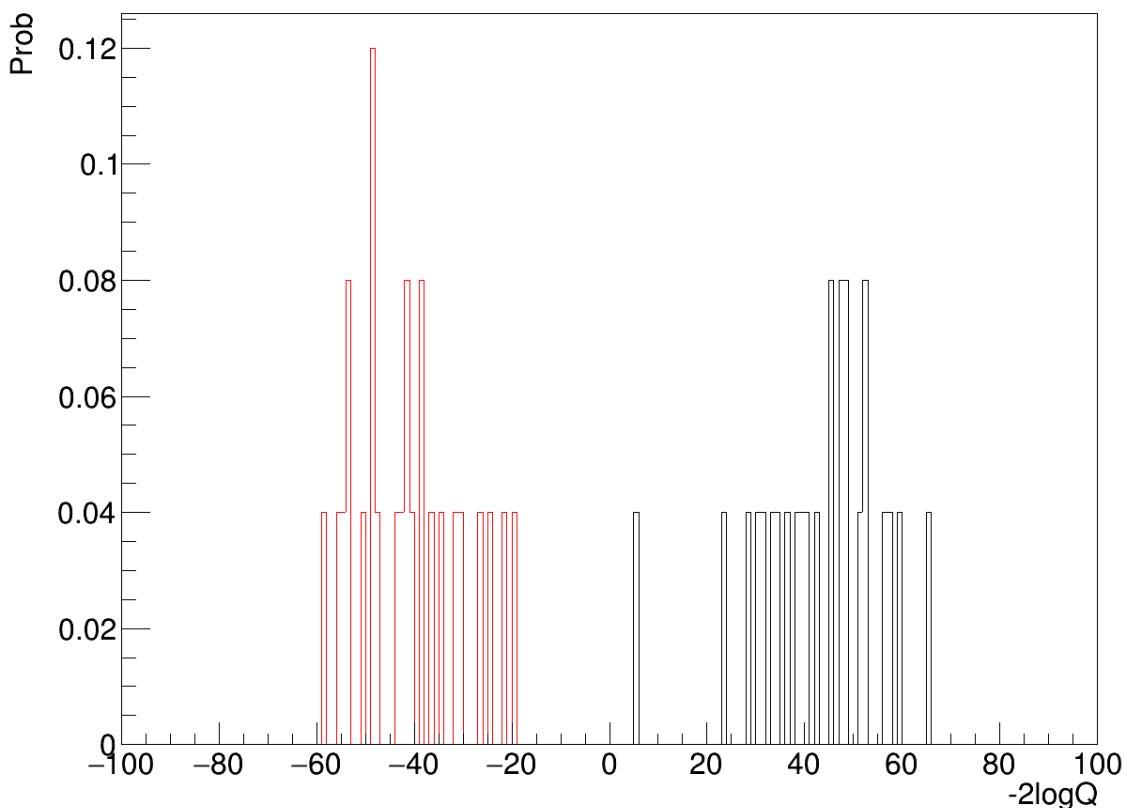
Likelihood ratio with 129 events at 250uK



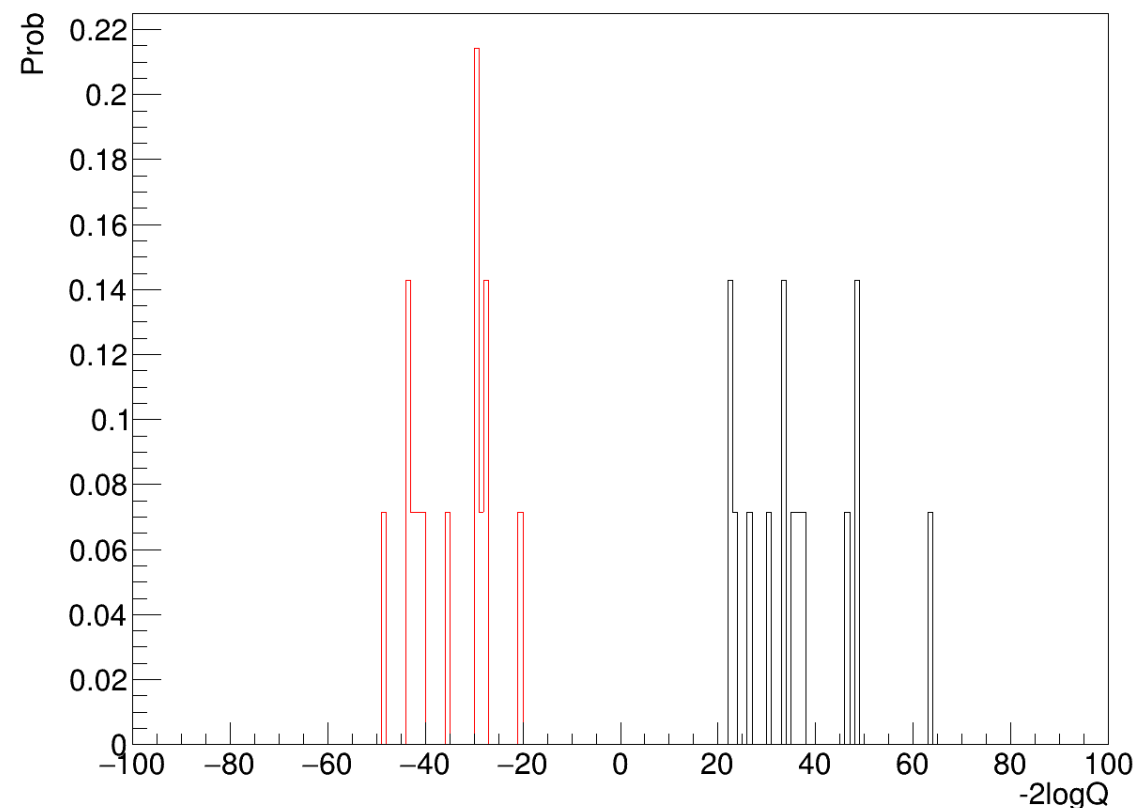
5 sigma separation

- 1mK : $1054/0.2 * 2 \text{ min} = 175 \text{ h}$
- 2.5mK: $1865/0.2 * 2 \text{ min} = 310 \text{ h}$

Likelihood ratio with 1054 events at 1mK



Likelihood ratio with 1865 events at 2500uK



5 sigma separation

- 5mK : $32000/0.2 \times 2$ min
= 220 days

