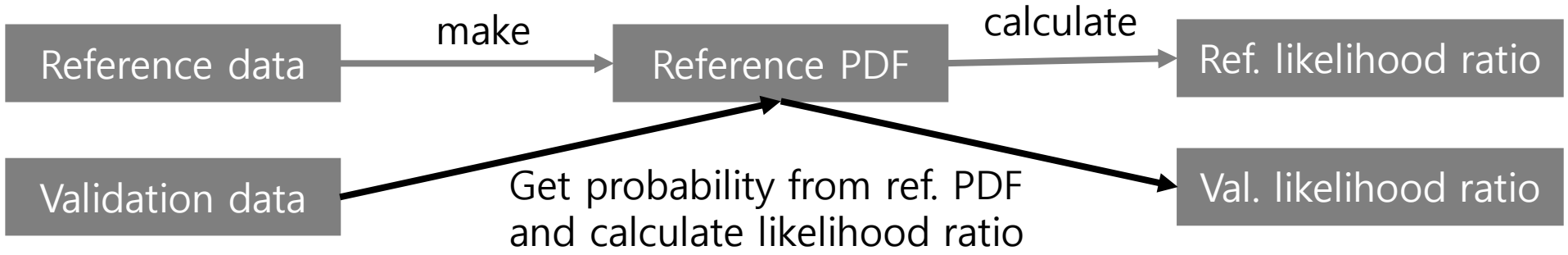
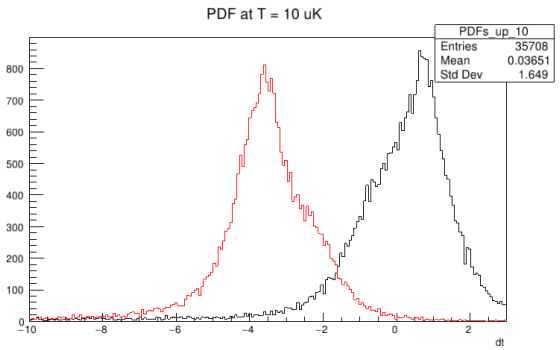
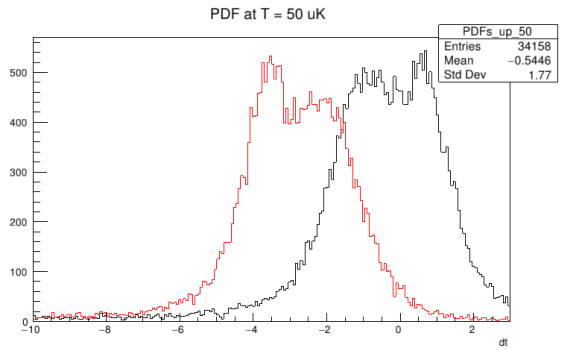
Likelihood ratio at different temperature

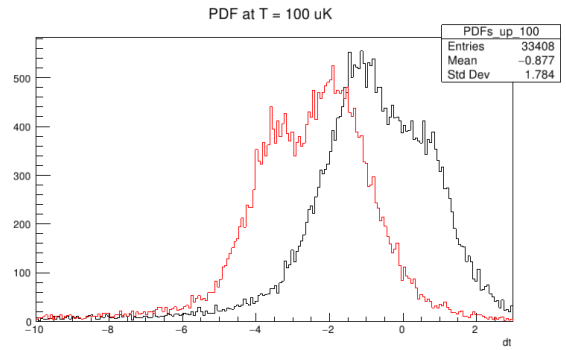
- Discrimination between upward and downward signal (digitized)
- dt < 3 cut & dt>-80 cut and ~3MeV threshold
- Likelihood ratio is given by Q= $\prod_{i=1}^{N} \frac{P_{up}(x_i)}{P_{dw}(x_i)}$ and use -2logQ
- N is the # of observed events set satisfying cut conditions.
- # of annihilation of ref. data = 100k
- # of annihilation of val. data = 50k

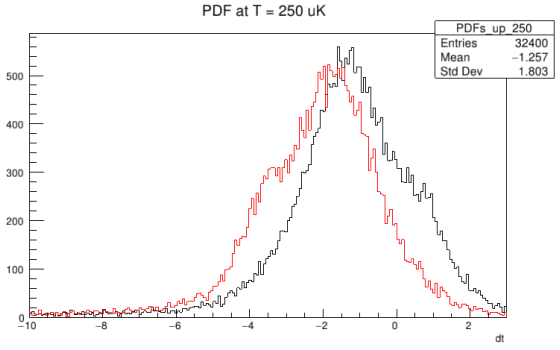


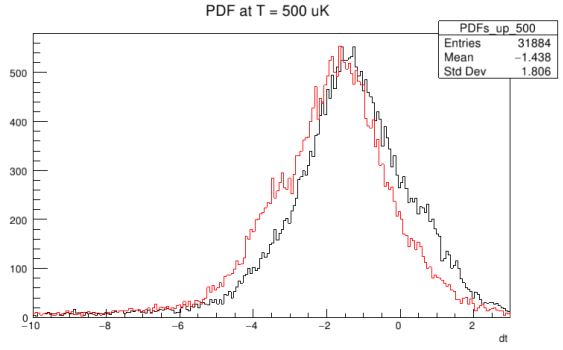
Reference PDF(cut on dt>-10)

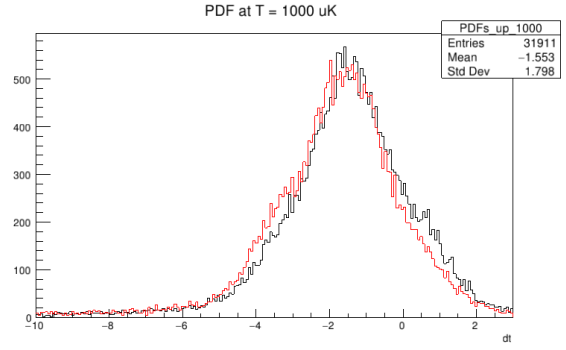


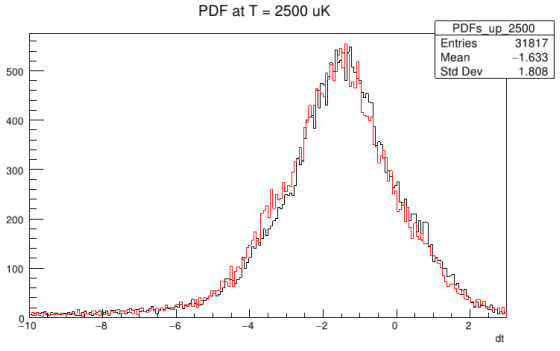


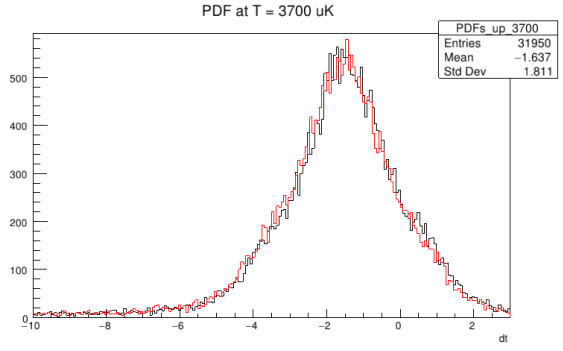


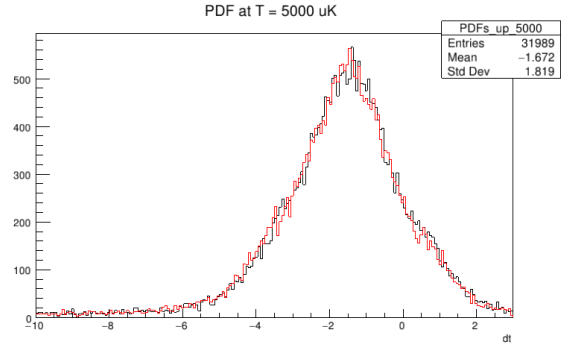




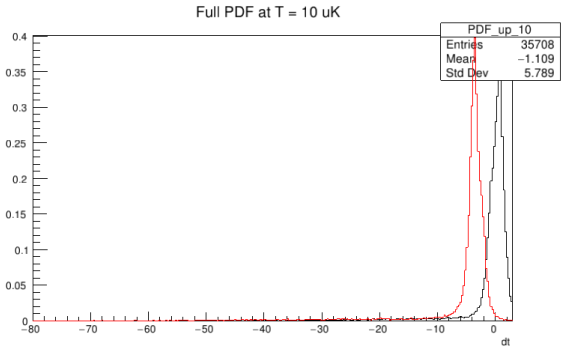


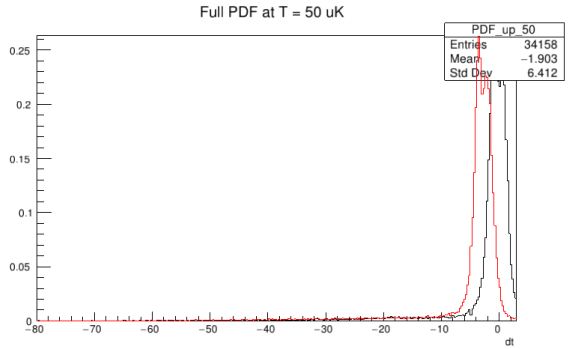


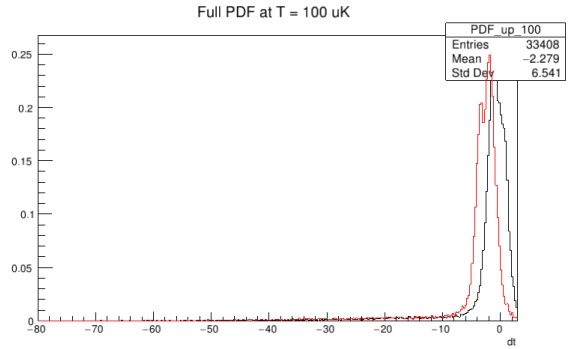


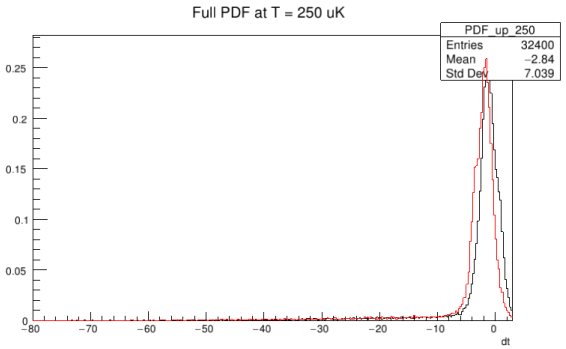


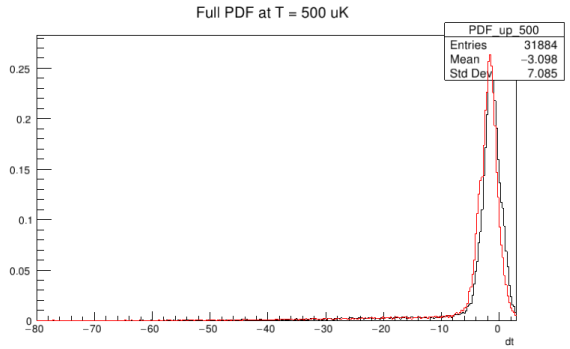
Full reference PDF

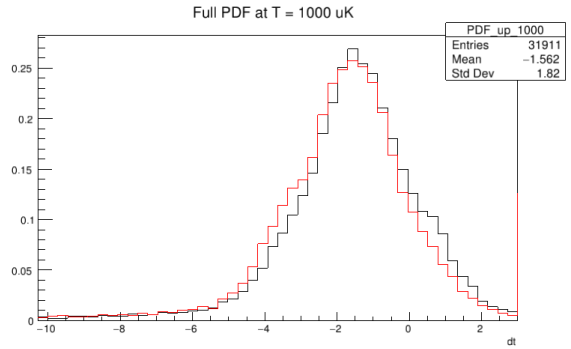


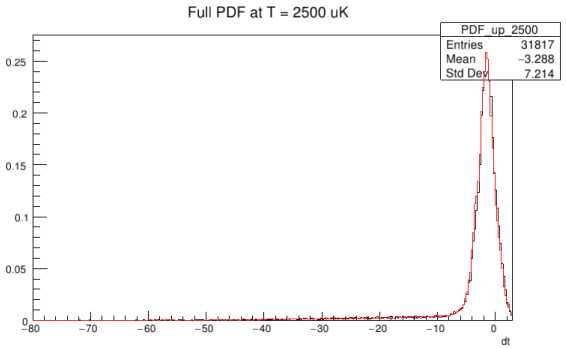


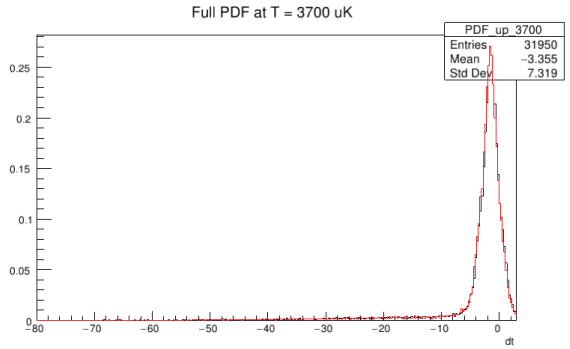


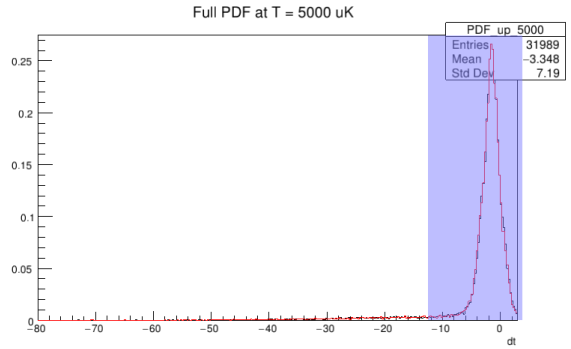






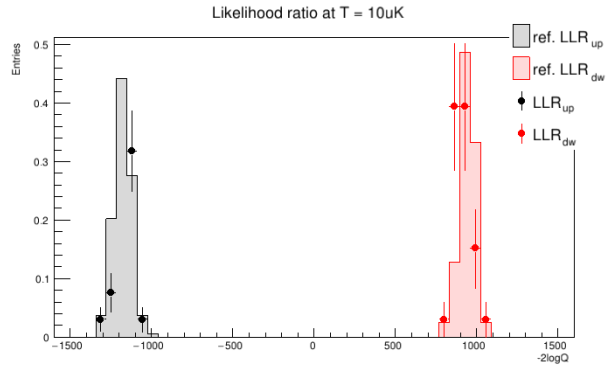


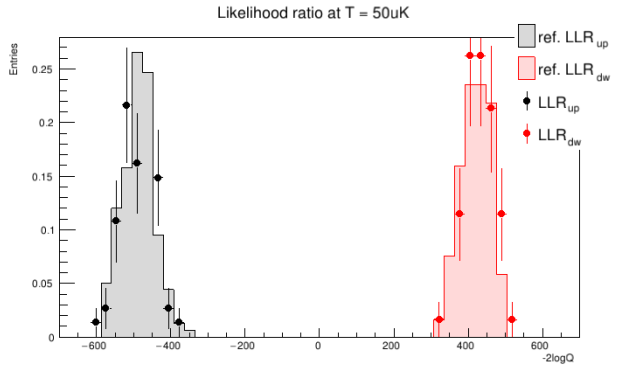


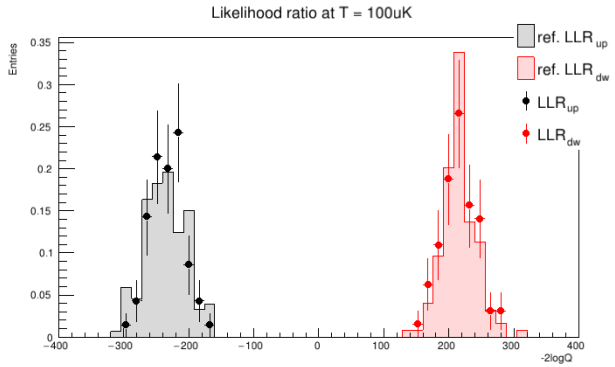


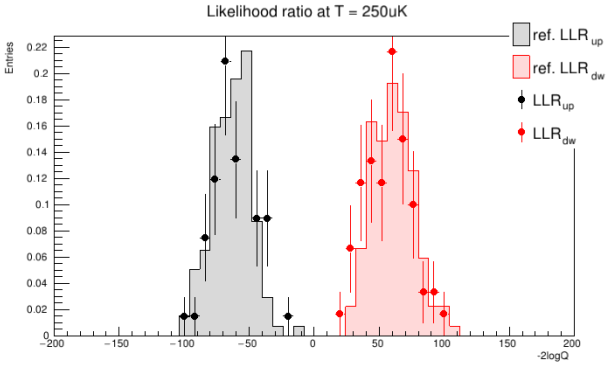
Likelihood ratio

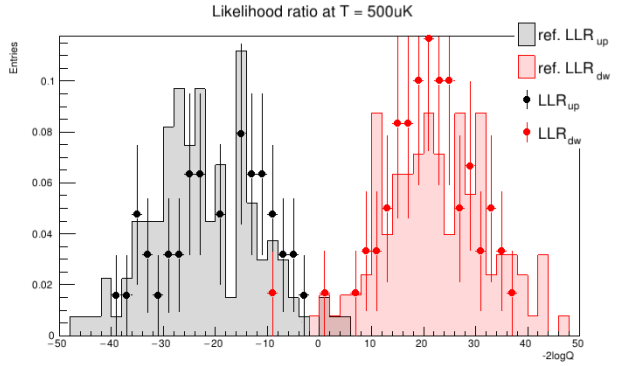
- N = 200
- One point represents 200 events set.

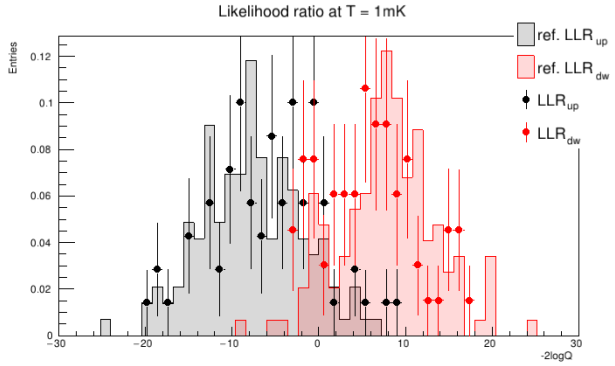


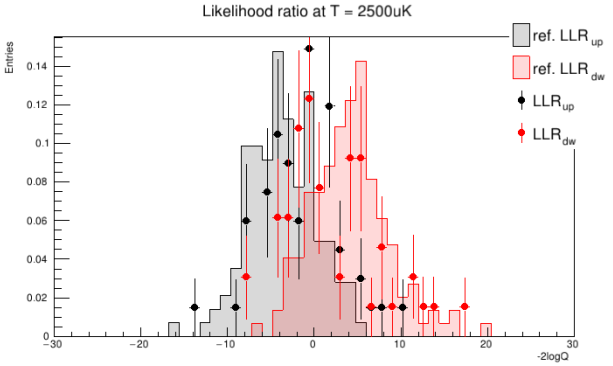


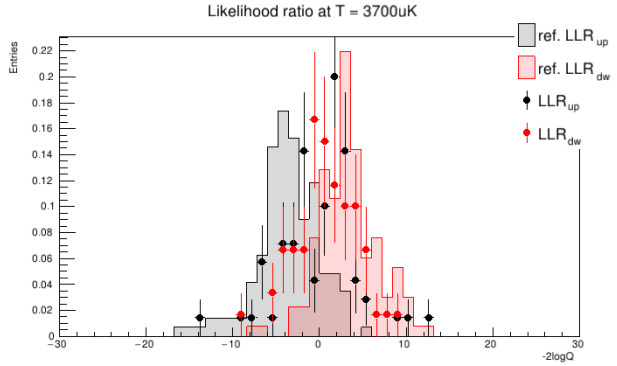


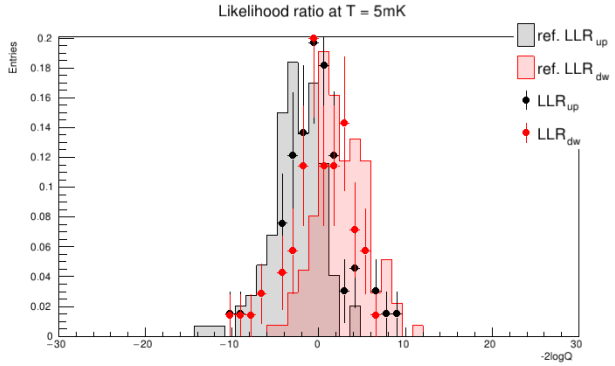












Likelihood ratio

- What I mistake was validation. Ref. data still shows possibility of discrimination.
- For this N, there is no clear separation over 1mK for val. data.
- But, # of entries of reference PDF seems too small.
- # of events is too small to cover large N.

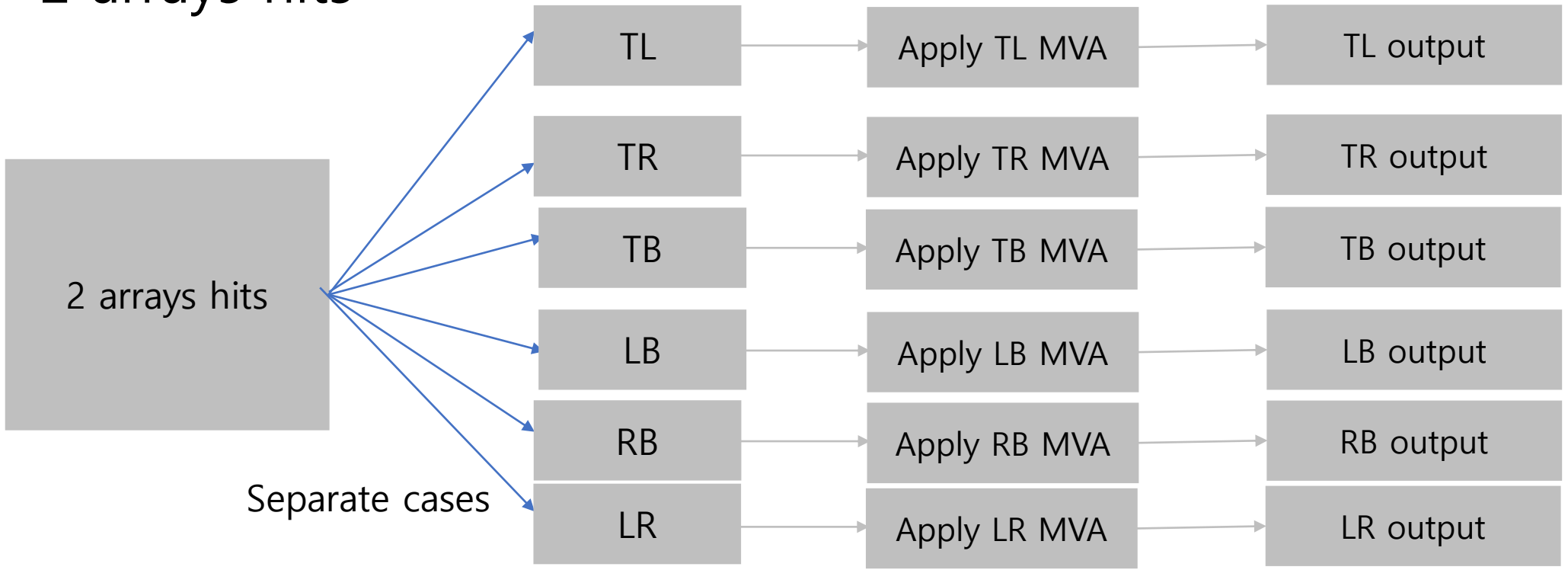
(with about 15000 val. data, 15 points of likelihood ratio can be calculated when N = 1000. It is too small to represent distribution of likelihood ratio.)

- Now I am making 2 million reference and validation datas.
- The data making will be done about Friday.

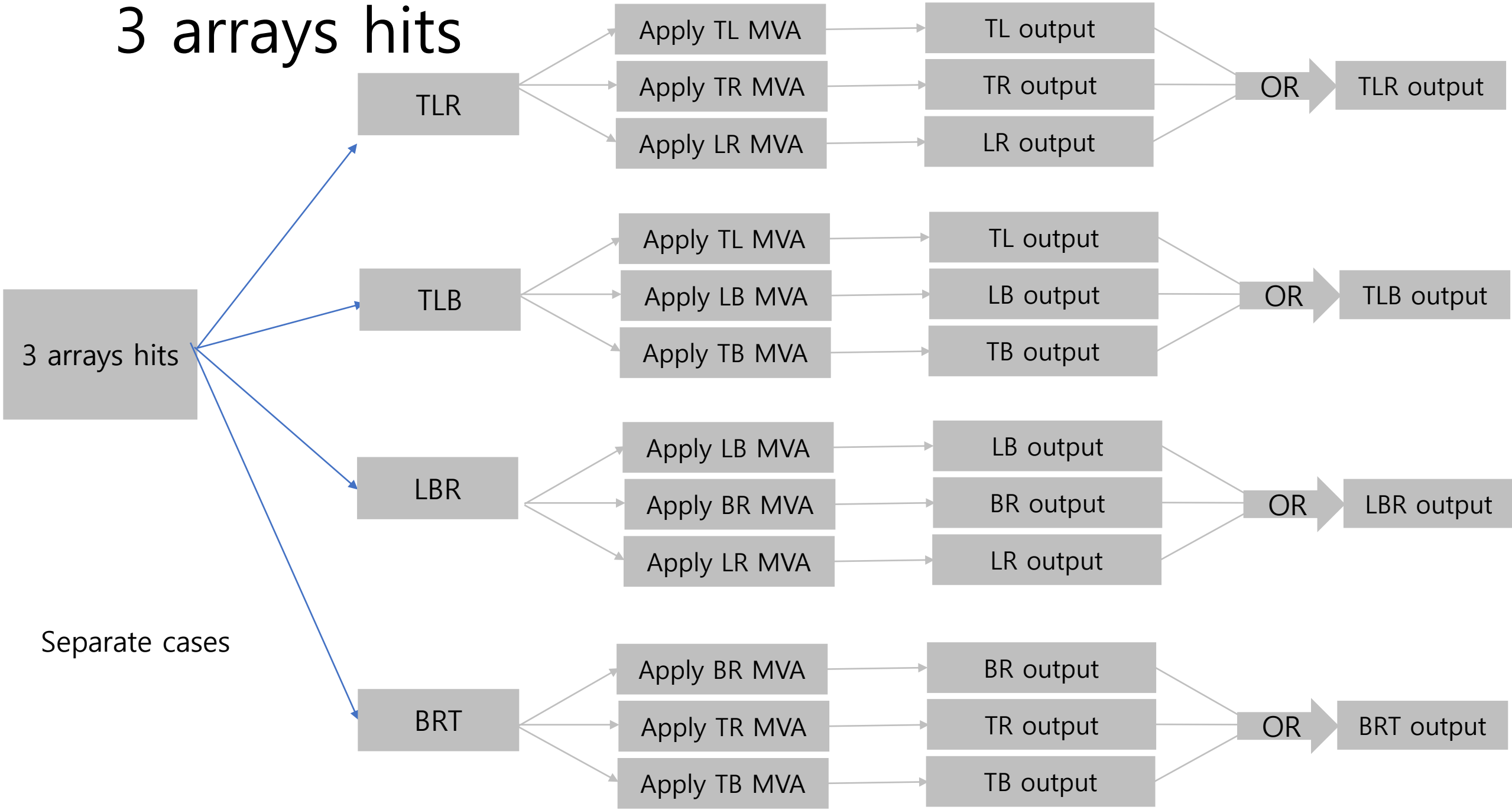
Background rejection

- Exclusively separate 2 arrays, 3 arrays and 4 arrays hits
- Train MVA for 6 combination TL, TR, TB, LB, RB and LR, respectively.
- Output means signal (1) or background (0)

- 2 arrays hits

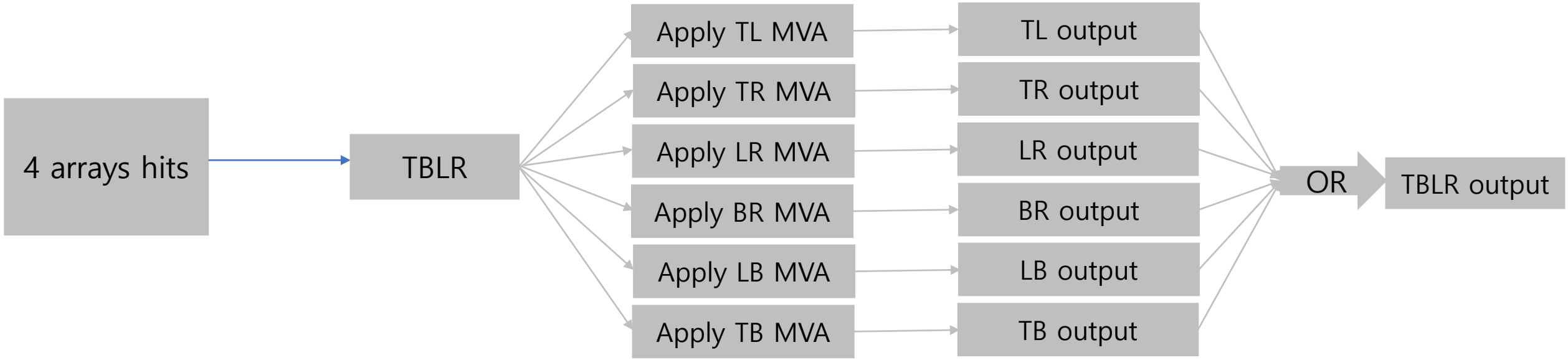


3 arrays hits



Separate cases

4 arrays hits



Background rejection

- Sum all results, then we get total output.