Photons->Photo-Electrons->PMT amplification-> Signal pulse

Energy deposit in the scintillator converted to Number of photo electrons

[one Hit per charged track]

For each hit in the Scintillator:

•Convert each hit to number of photons [1MeV = 10400 photons (~68%)(For Scintillator EJ-204)]

•Calculate the total number of photons which will reach the PMT

#photons = light Collection Efficiency [10% at this moment] * total number of photons corresponding to each hit

Photon arrival time to the PMT is simulated using the crystal ball function, which is parametrized with the output from the oscilloscope from the vertical cosmic measurement
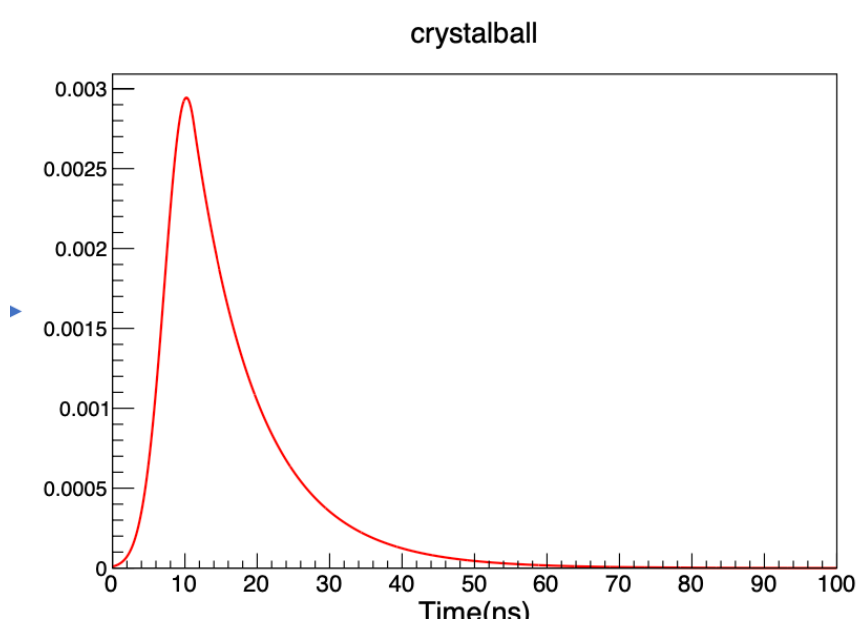
Further, time spread due to PMT transit time (per photo-electron) from the following distribution

PMT time response to
a single photoelectron
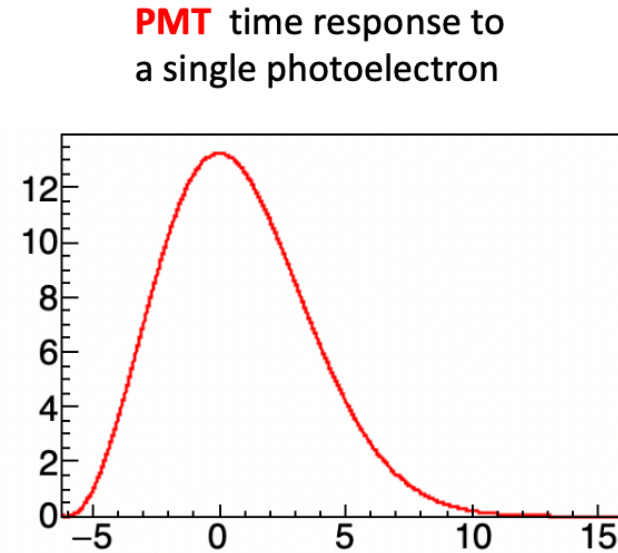
• Total charge per Hit from PMT is computed using number of photo-electrons and PMT gain
• Total charge is distributed over pulse per photo-electron using time and amplitude response of the PMT

Total signal pulse is finally generated for each PMT module (Total 48 for FV0), which is finally used for the calculation of the CFD time and Charge.

The CFD time, which we get in pp collisions are around 22 ns. For the scintillator where we don't have hits, the time is by default just set to -1024.