

Status of the algorithms for building pulses

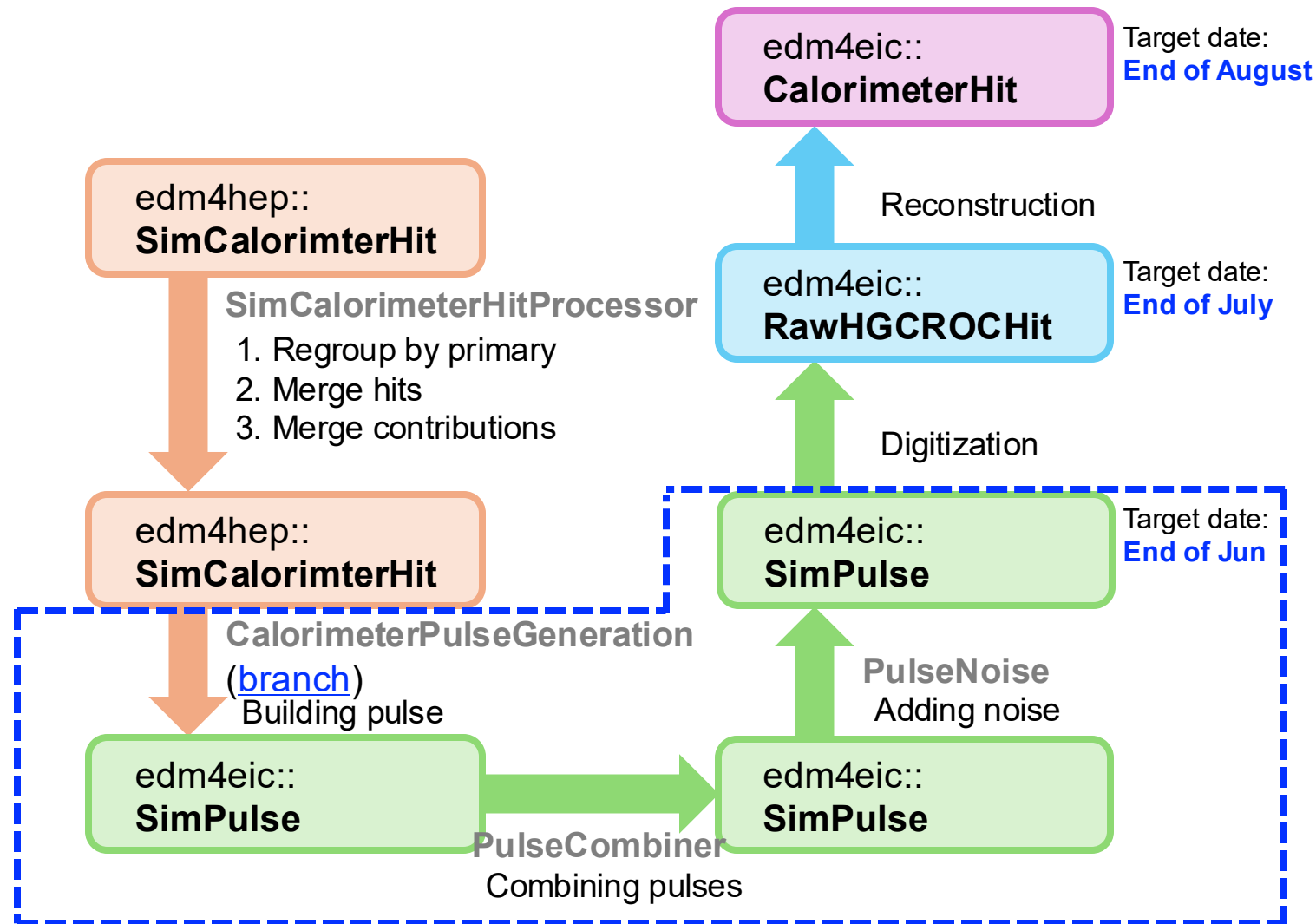
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BIC Simulation Meeting

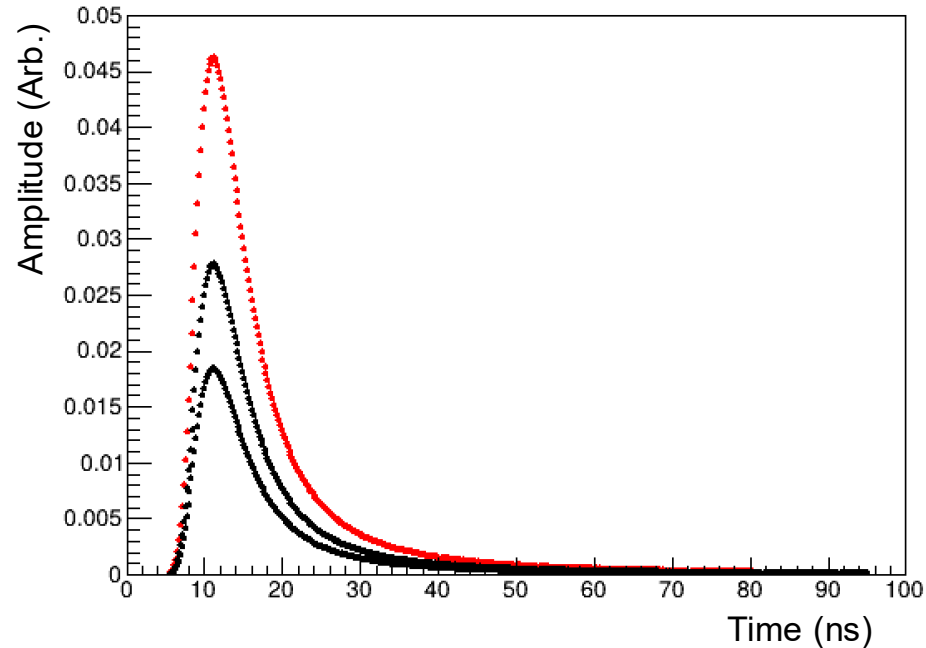
June 10, 2025

Progress during the Calo work fest

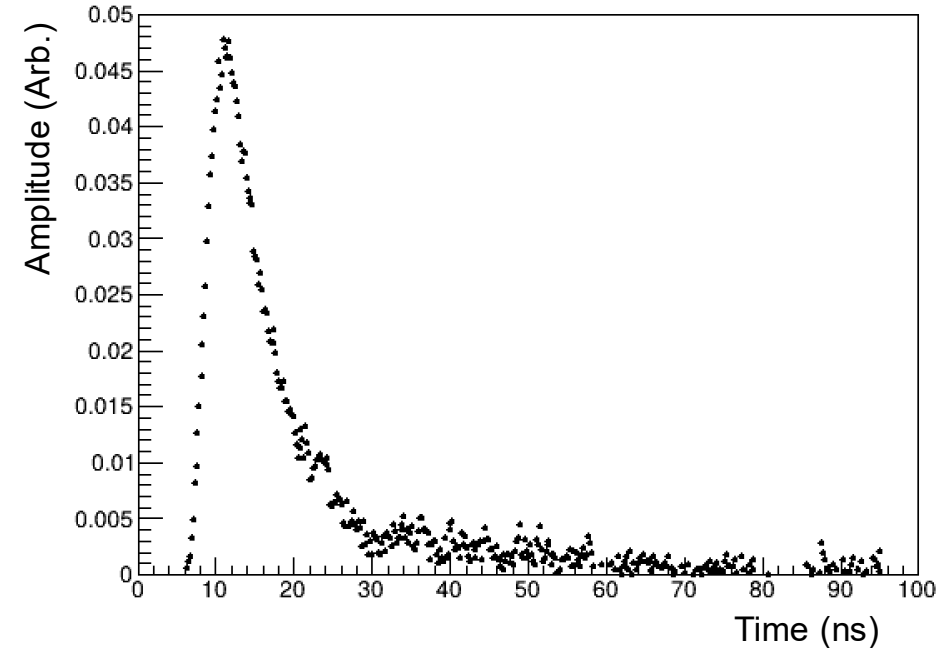


Building and combining pulses with noise

Combining two pulses



Adding noise



- Basic structure of the `CalorimeterPulseGeneration` has been implemented.
- Output of the `CalorimeterPulseGeneration` is also well compatible with `PulseCombiner` and `PulseNoise`.
- The “Adding noise” step will follow Henry’s study.

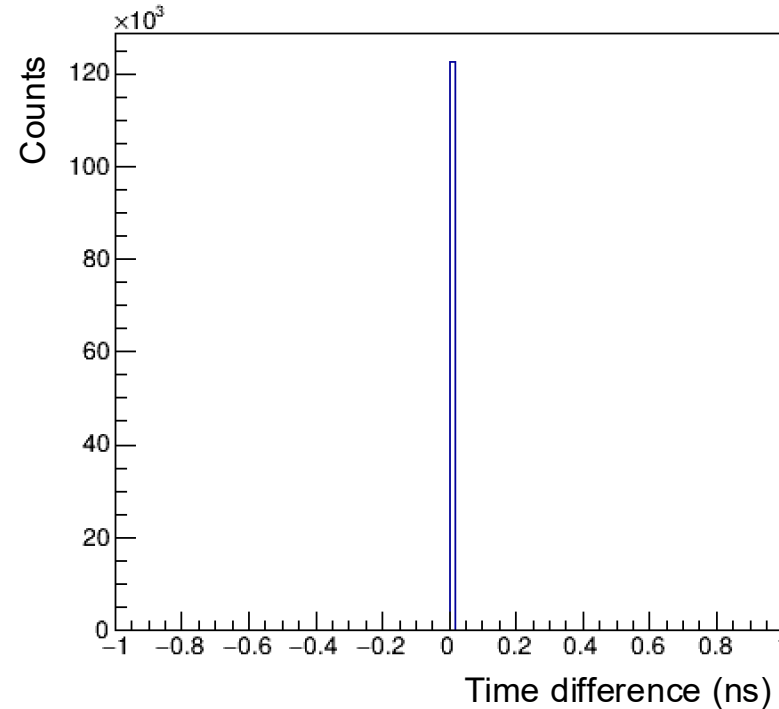
Classes for template pulse

algorithms/digi/SiliconPulseGeneration.cc

```
✓ class LandauPulse : public SignalPulse {  
    public:  
✓    LandauPulse(std::vector<double> params) {  
  
        if ((params.size() != 2) && (params.size() != 3)) {  
            throw std::runtime_error(  
                "LandauPulse requires 2 or 3 parameters, gain, sigma_analog, [hit_sigma_offset], got " +  
                std::to_string(params.size()));  
        }  
  
        m_gain          = params[0];  
        m_sigma_analog = params[1];  
        if (params.size() == 3) {  
            m_hit_sigma_offset = params[2];  
        }  
    };  
  
    double operator()(double time, double charge) override {
```

- The classes that implement pulse shape for **SiliconPulseGeneration** are declared in the source file.
- Their declarations were moved to the header file so that they can be used in **CalorimeterPulseGeneration**.

Time of the pulse and Energy deposit \rightarrow Npe



- We should implement the travel time of the scintillation light in the fiber. It will be implemented in the previous [SimCalorimeterHitProcessor](#).
- The “Energy deposit \rightarrow Npe” will be additionally implemented with Poisson smearing in the [CalorimeterPulseGeneration](#).