## Forward Time-of-Flight Reconstruction Software

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The code to reconstruct the signals from the Forward Time-of-Flight system (FTOF) is part of the third generation event reconstruction package under development by the CLAS12 Software Group. This package uses a service-oriented architecture called CLARA and the FTOF code has been written as a software service so that it can be easily integrated into that framework. The FTOF code converts the TDC and ADC signals into times and energies and corrects for effects like time walk. The position of the hit along the paddle is determined by the difference between the TDC signals and the time of the hit reconstructed using the average TDC signal and correcting for the propagation time of light along the paddle. The energy deposited is extracted from the ADC signal and corrected for light attenuation along the paddle. Modifications to this procedure are applied when one of more of the ADC or TDC signals are missing. The FTOF code is up and running and will be used in the upcoming 'stress test' of the full CLAS12 event reconstruction package.

The procedures described above have been modeled after the ones used in the CLAS6 FTOF reconstruction and tested using Monte Carlo data from the CLAS12, physics-based simulation *gemc*. We show in Fig. 1 a histogram of the number $N_{adj}$ of adjacent paddles in a cluster normalized to the total number of events. Clusters are formed in a single panel by grouping adjacent hits together. The red, open circles are $N_{adj}$ for panel 1b. The black, filled squares are for panel 1a which is behind panel 1b relative to the target. Most events consist of a single hit, but there is a significant number that have additional paddles in each cluster. The dropoff as $N_{adj}$ goes up is similar for both panels until $N_{adj}$ becomes large. The simulation was done at 11 GeV using the disgen event generator.

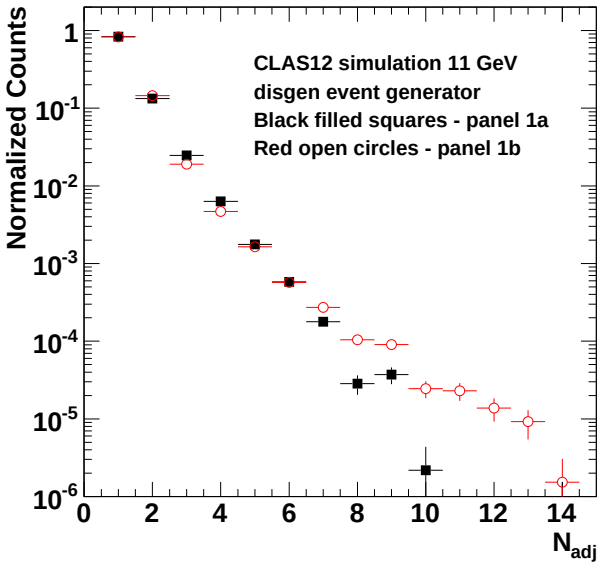


Figure 1: Histogram of cluster size from *gemc* Monte Carlo data for panels 1a and 1b of the Forward Time-of-Flight system.