

# The ATLAS Forward Proton Time-of-Flight Detector System

*Thursday 18 July 2024 20:40 (20 minutes)*

The Time-of-Flight (ToF) detectors in the ATLAS Forward Proton (AFP) system are used to measure the primary vertex z-position of the pp → pXp processes using the arrival times of the two intact final state protons. Detection efficiencies and timing resolutions using low, and moderate pile-up data collected are presented. While efficiencies of a few percent are observed in the Run 2, the resolutions of the two ToF detectors of 21 ps and 28 ps are measured. This corresponds to the expected precision of  $5.3 \pm 0.6$  mm for the vertex reconstruction. The subsequent analysis confirms that the vertex position obtained with the ToF aligns with the value from the ATLAS central detector at the level of  $6.0 \pm 2.0$  mm. During long shutdown 2, the ToF detector underwent major upgrades in electronics, optics, and mechanics, expected to provide a substantial improvement in detection efficiency. Preliminary results for efficiency and resolution studies based on Run 3 data taken will be presented.

## Alternate track

### I read the instructions above

Yes

**Author:** CERNY, Karel (Palacky University (CZ))

**Presenter:** CERNY, Karel (Palacky University (CZ))

**Session Classification:** Poster Session 1

**Track Classification:** 12. Operation, Performance and Upgrade (incl. HL-LHC) of Present Detectors