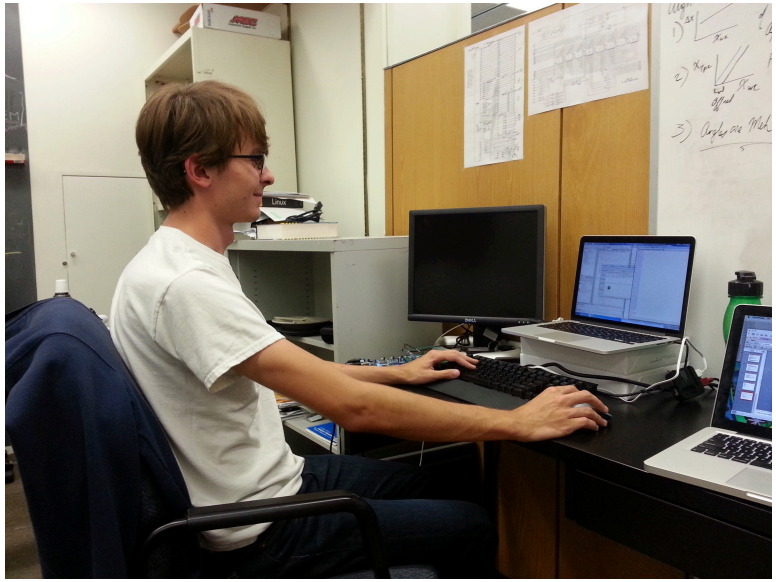
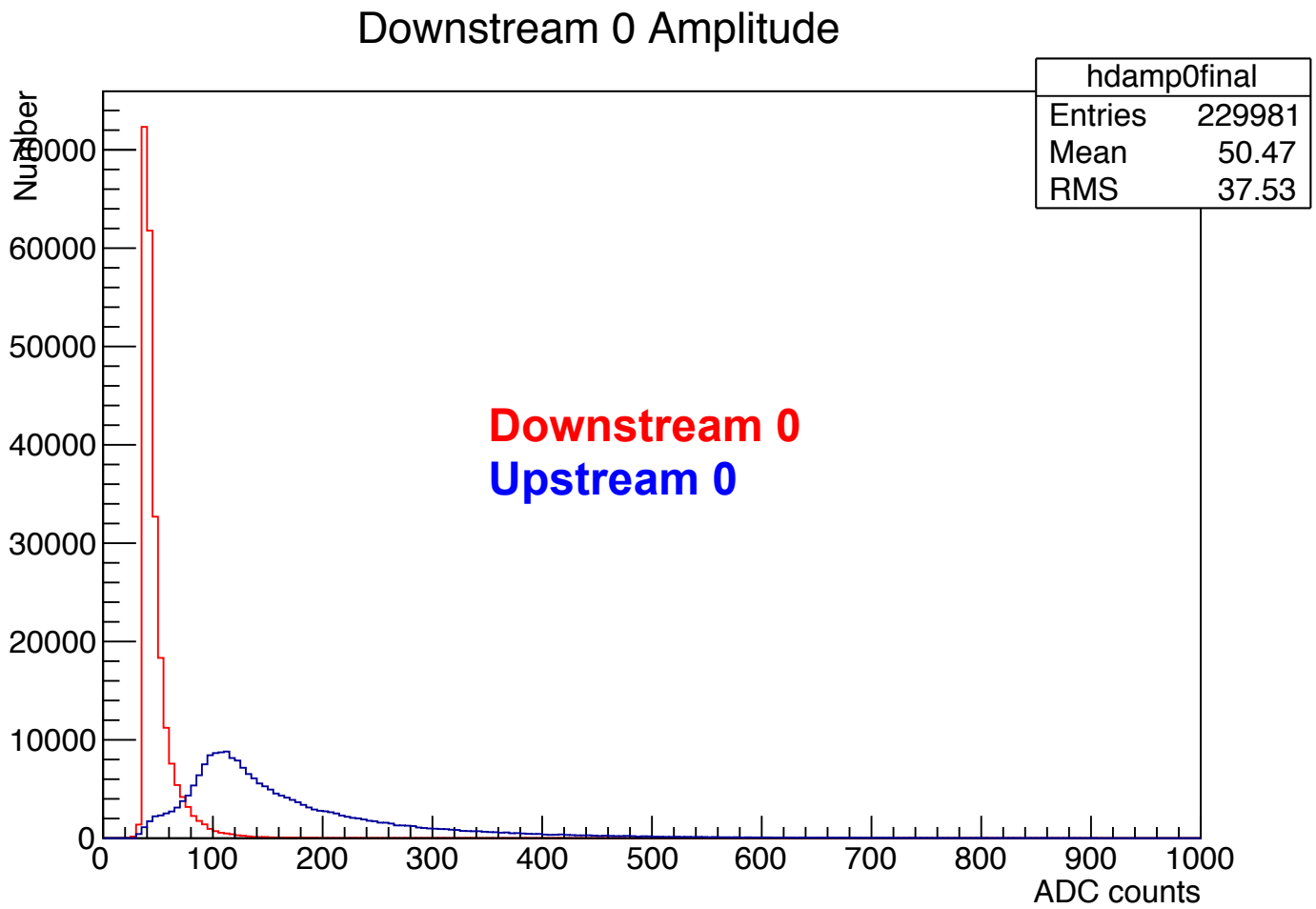
Time of Flight Pulses: Drifting Downstream



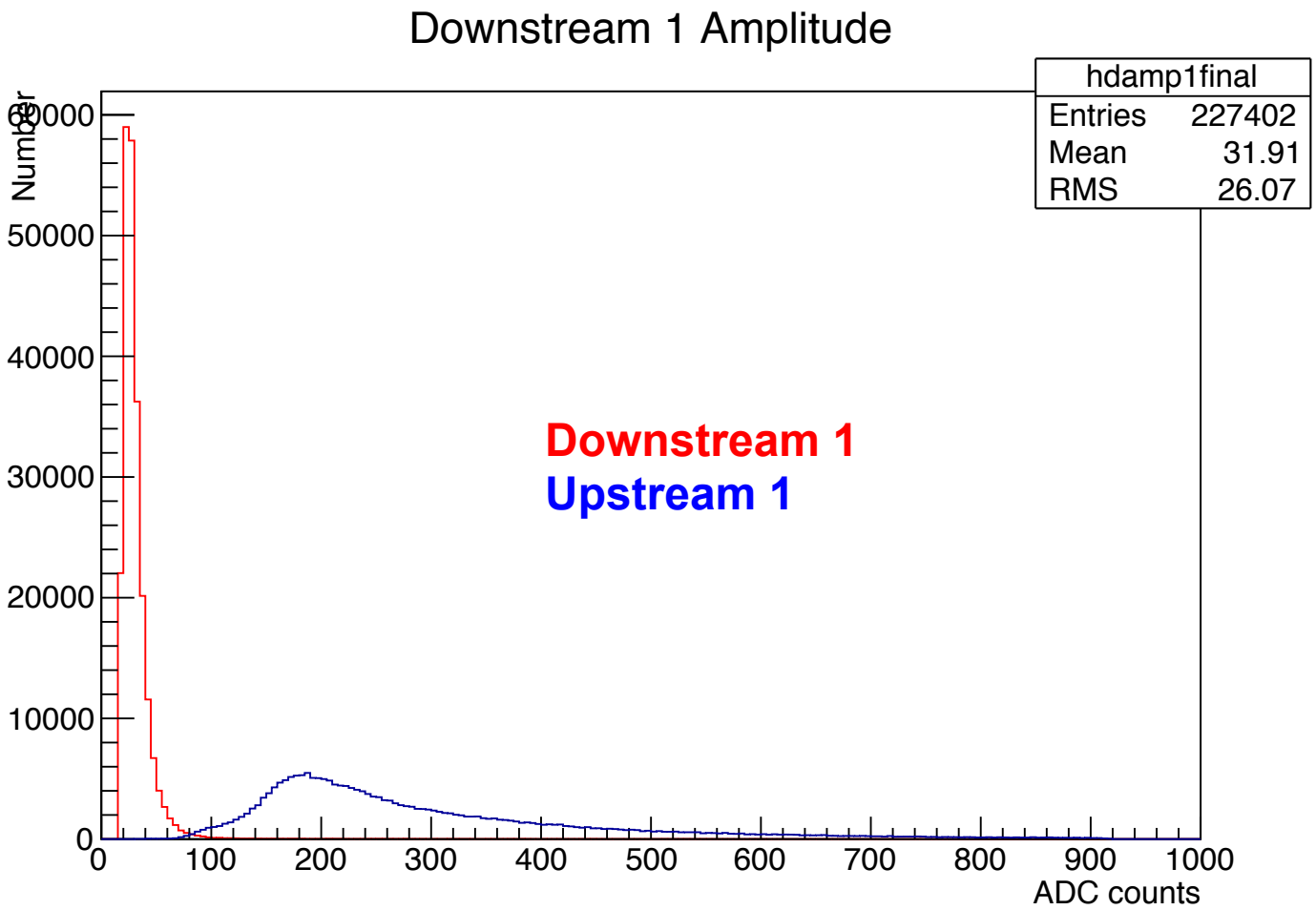
Dan Smith, Rob Carey

LArIAT Summit

Downstream TOF scintillator signals are not so lovely as their upstream counterparts

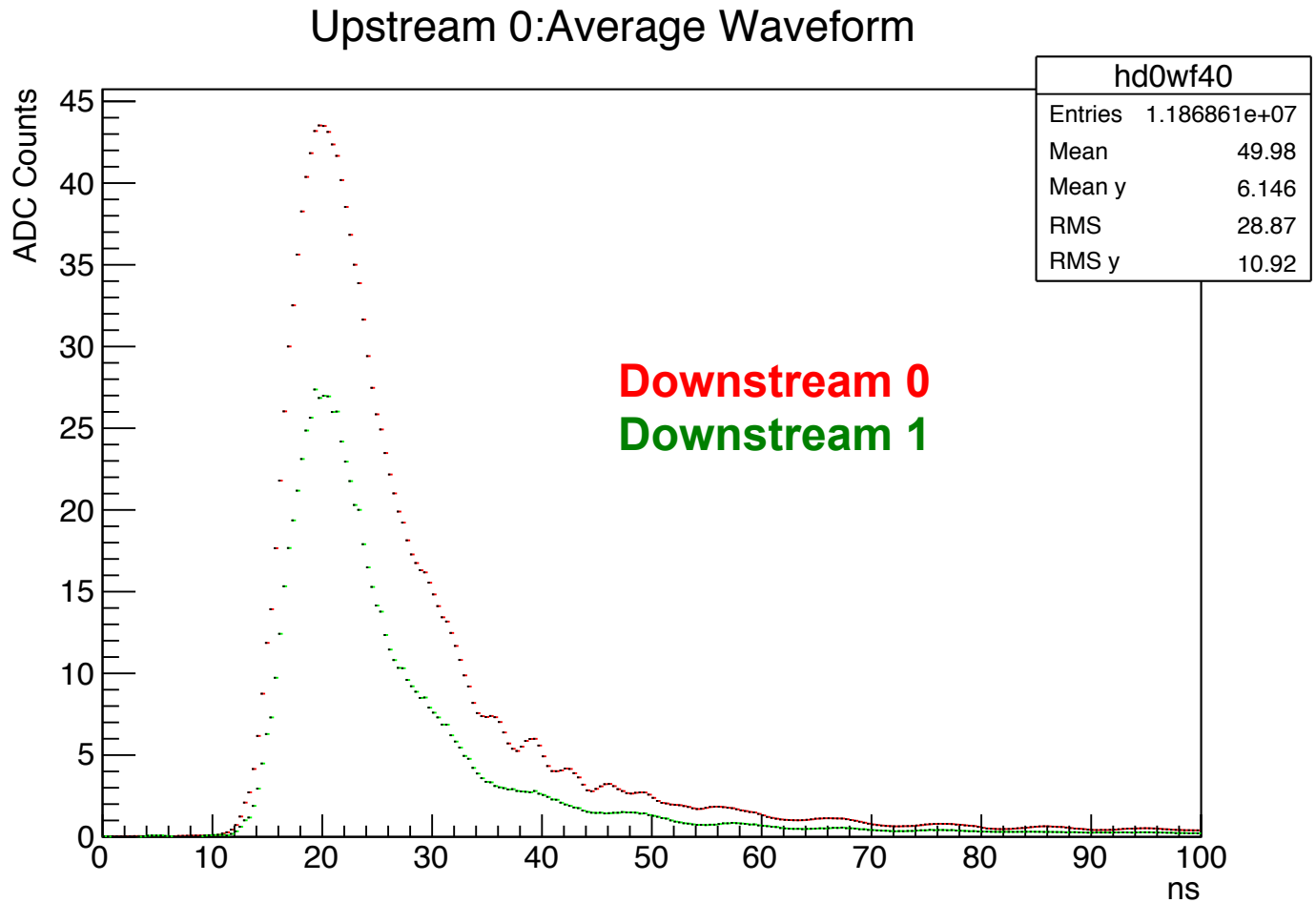


Signals are Smaller



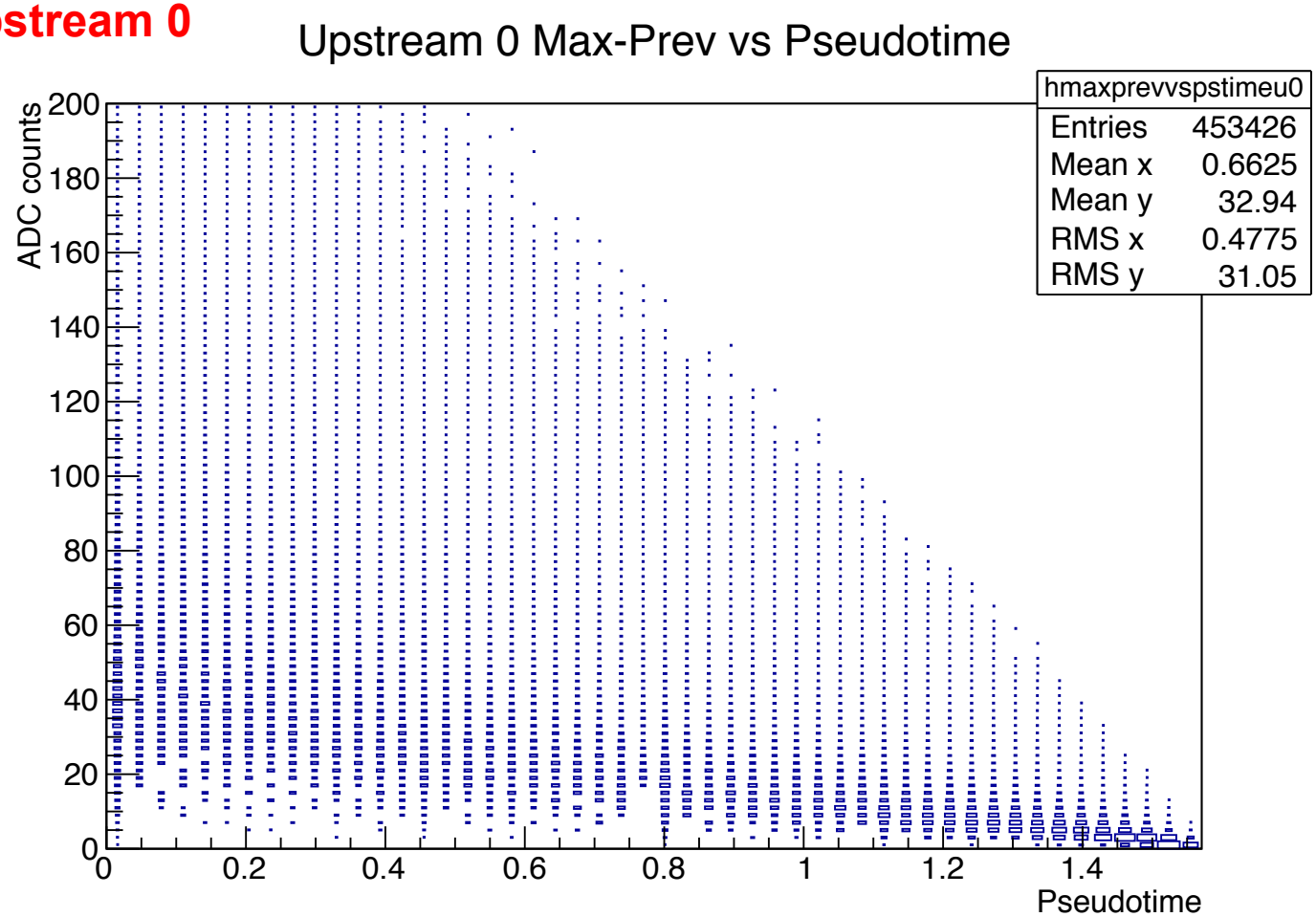
Waveforms aren't as smooth: for smooth average pulse, chose 400 ps sampling

Beware the cropped average!



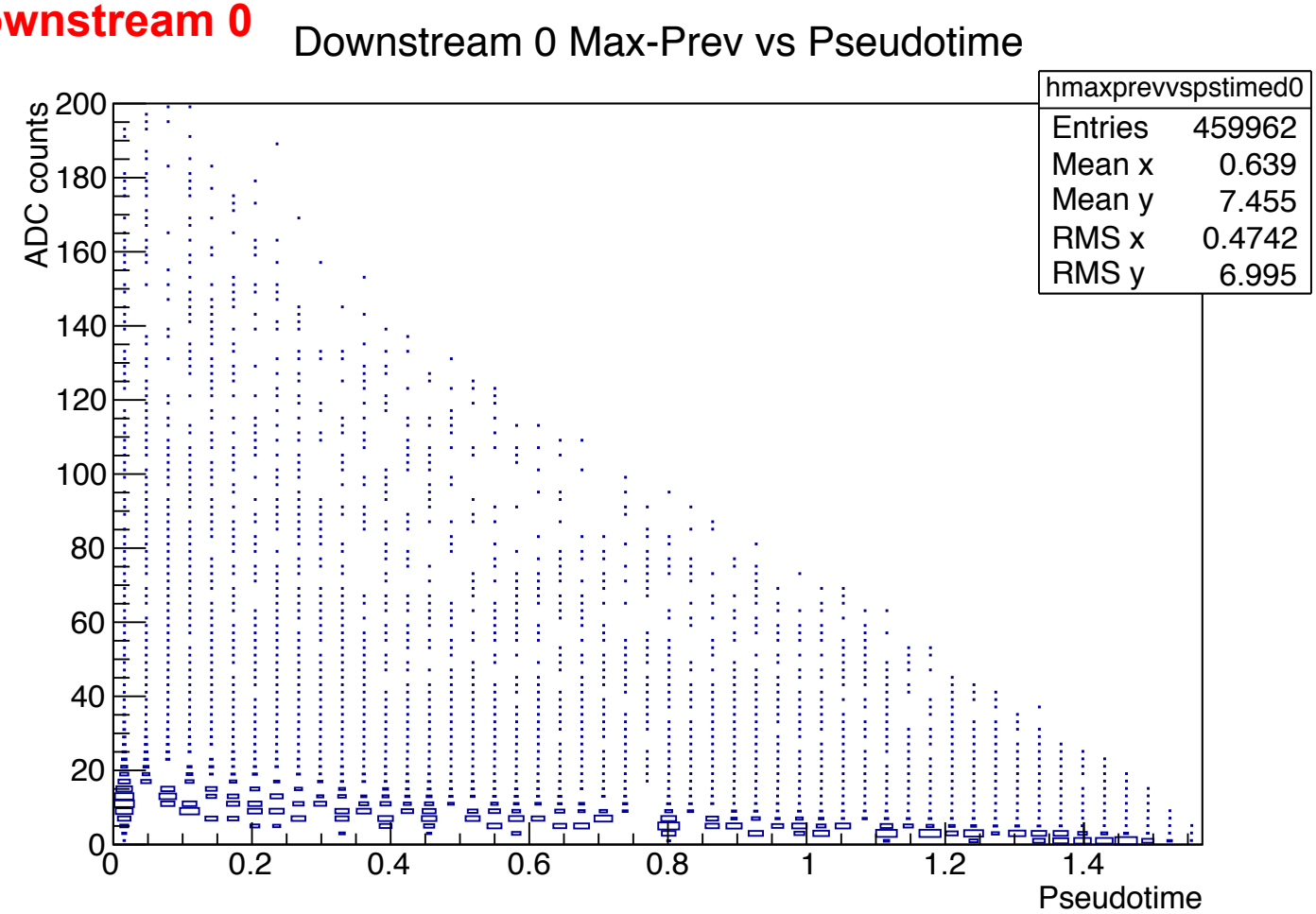
Smaller signals means smaller MAX-PREV, MAX-NEXT

From Upstream 0

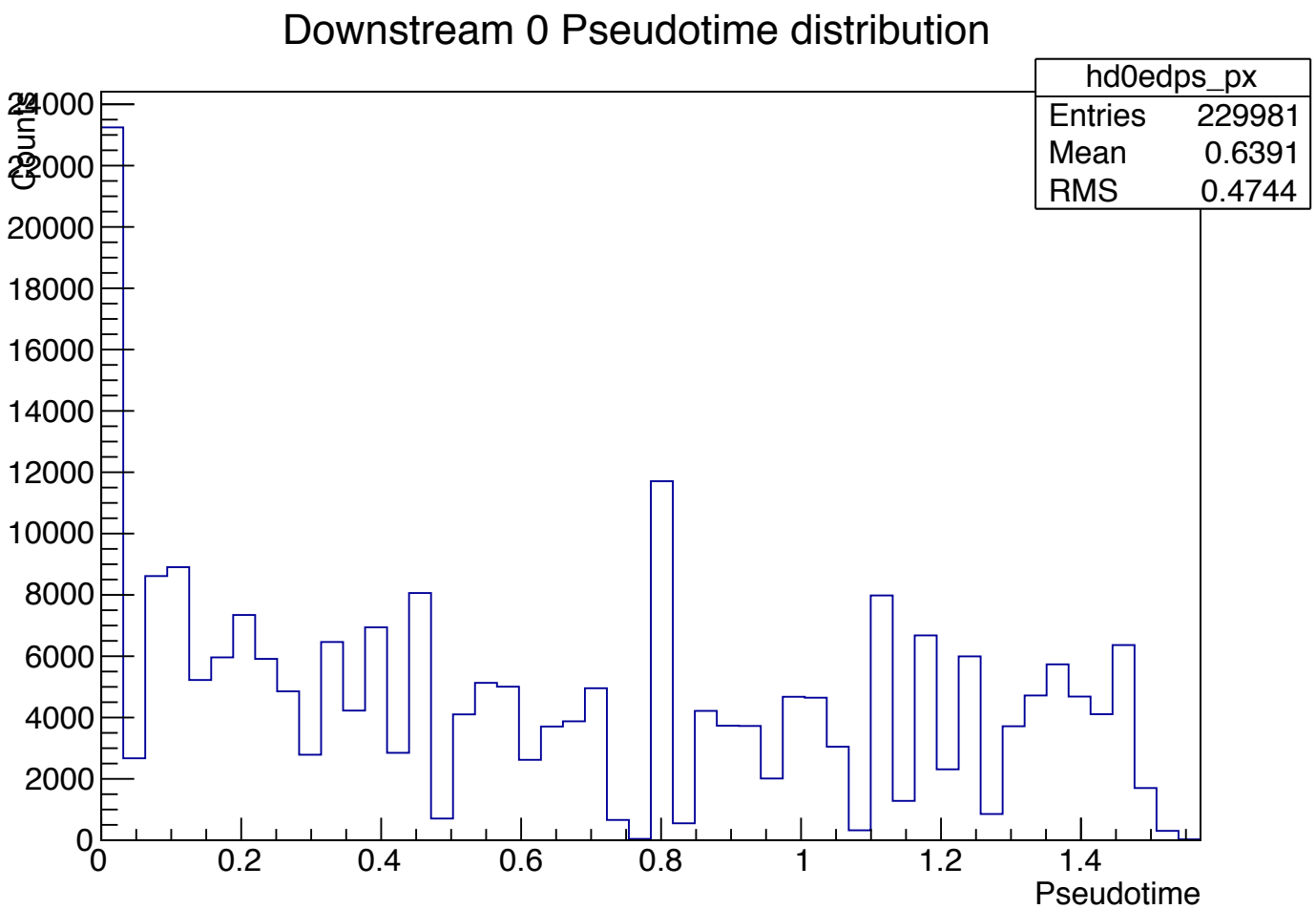


Downstream Max-Prev has little dynamic range

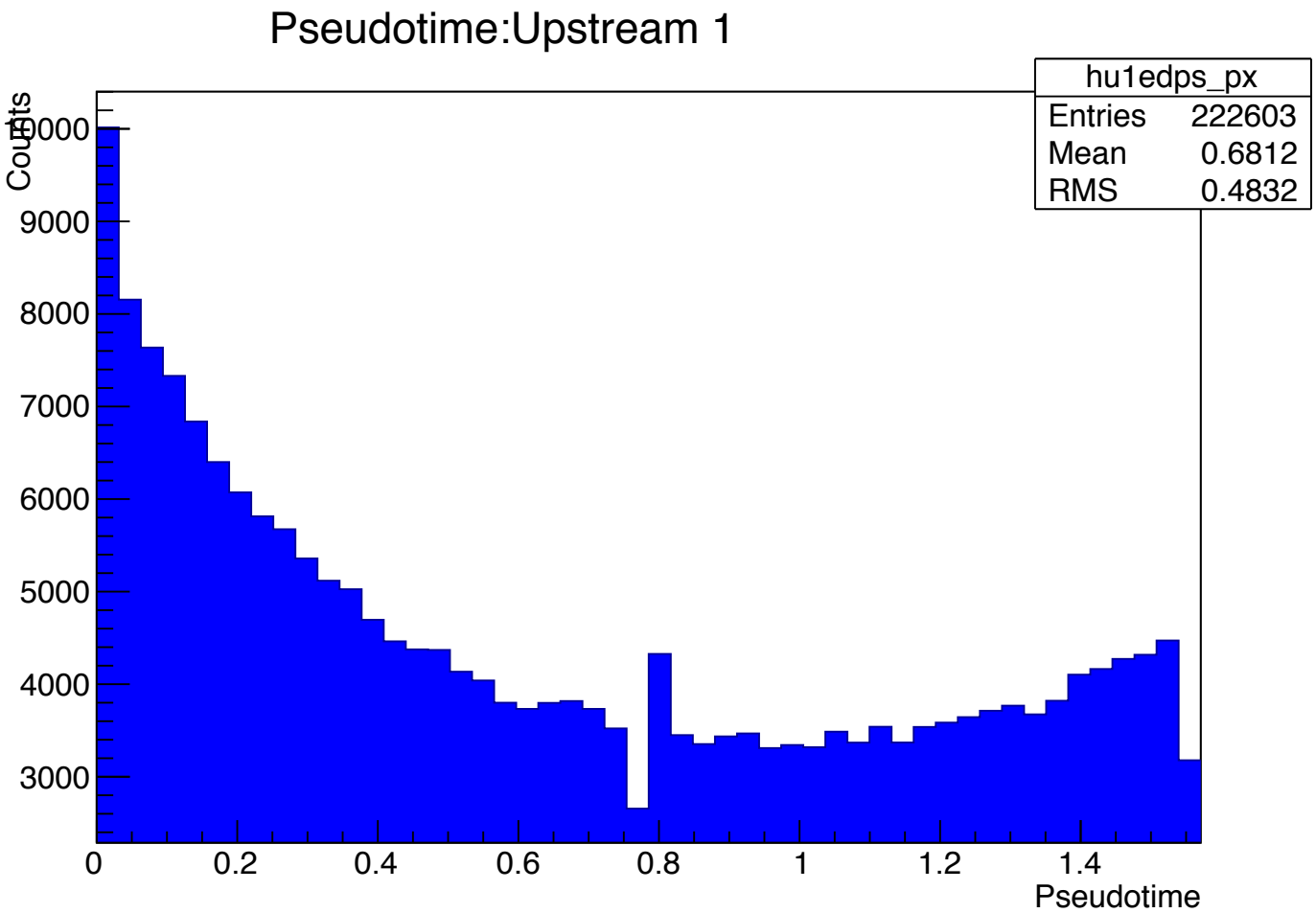
From Downstream 0



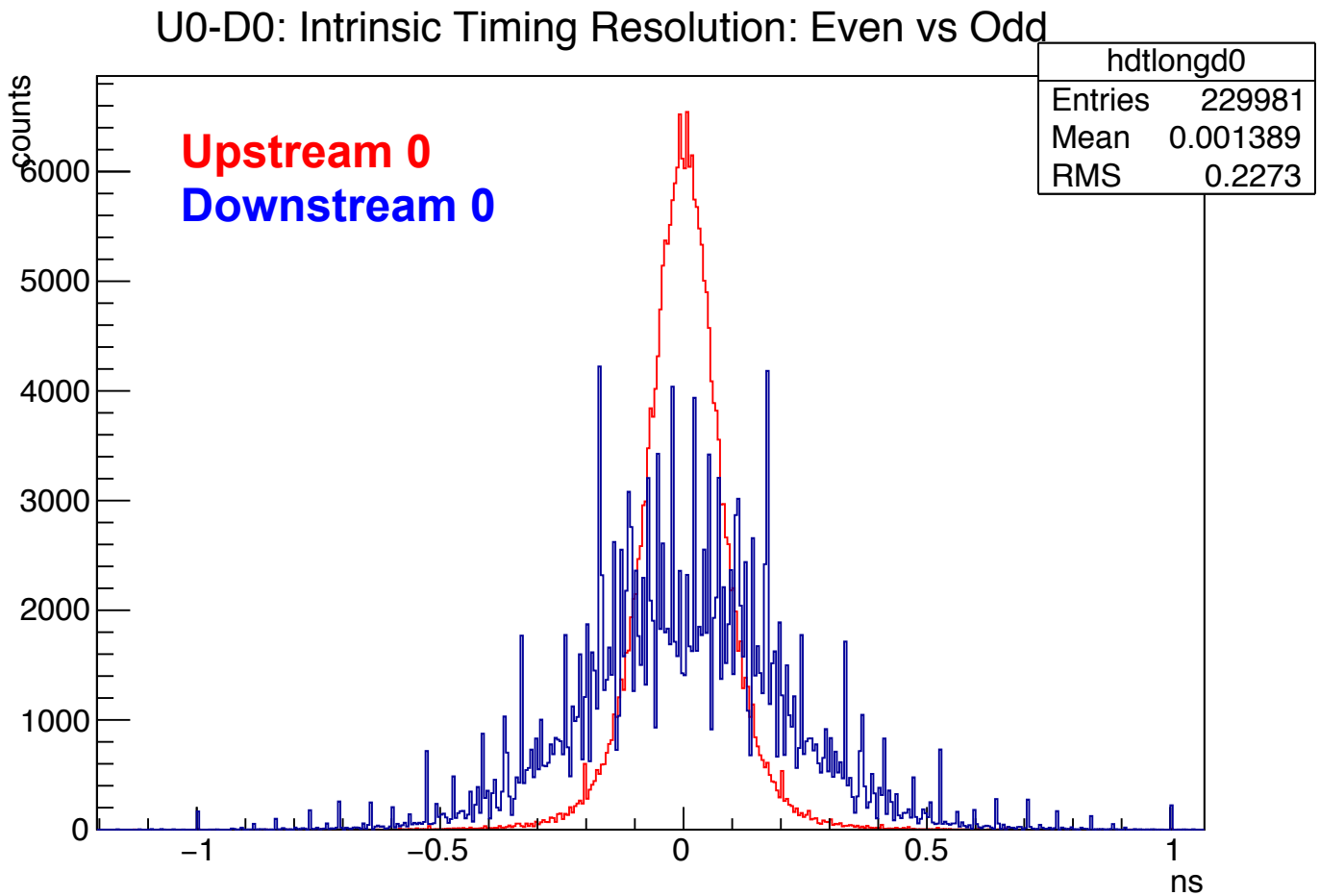
Smaller (MAX-PREV), MAX-NEXT means a rougher pseudotime distribution



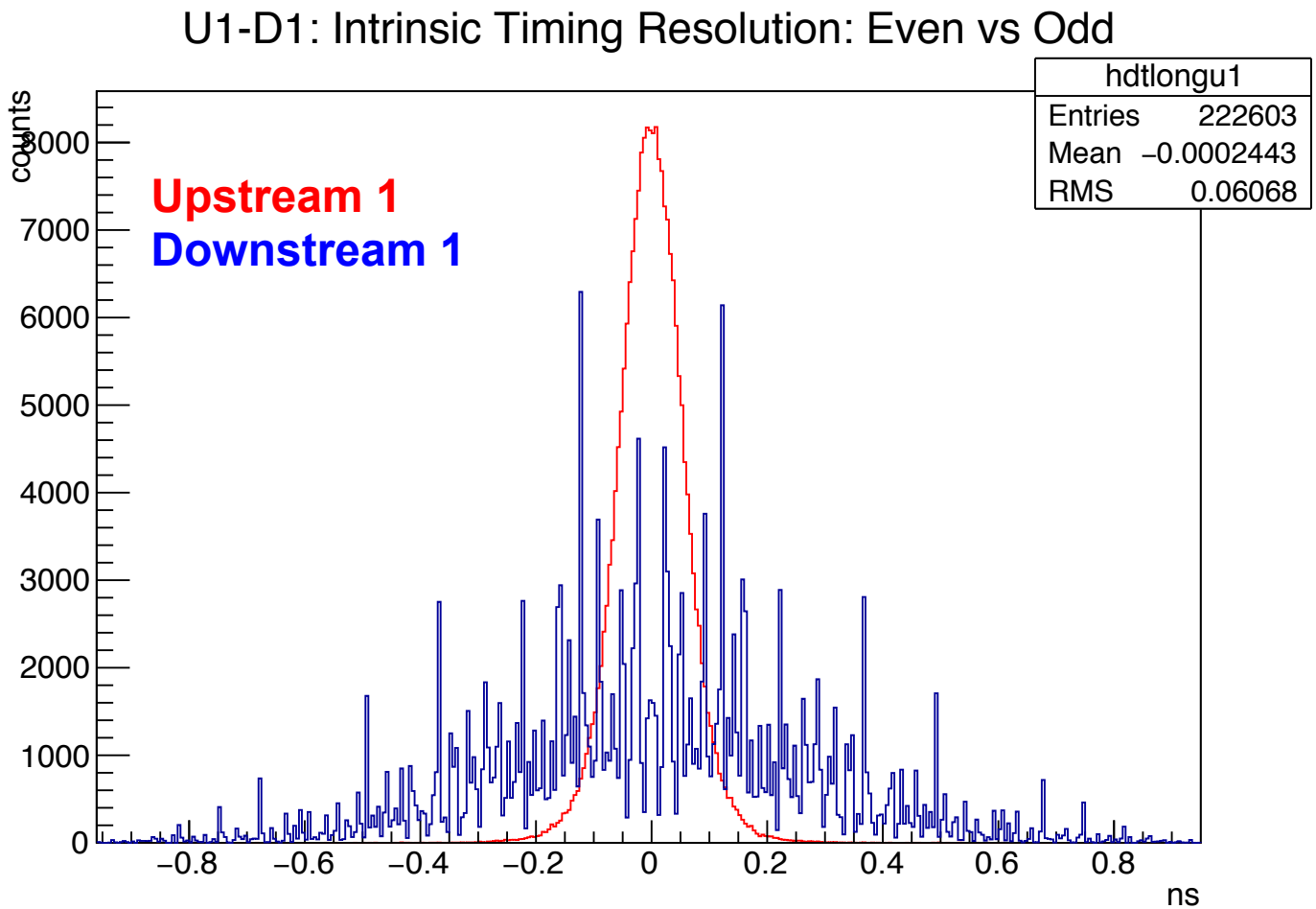
Why can't you be more like the upstream counters?



The rougher pseudotime distribution implies an inferior intrinsic time resolution



Same story for U1D1



We sure could use a little more light!

A Diversion

Can we correct the data?

- Want to correct for variable transit times in the scintillator
- **TOF isn't very useful for electrons but electrons are useful for TOF: electrons all move at c. Also, true TOF does not depend (much) on transverse hit positions on scintillators (quadrature sum of meters and centimeters).**

What data do we need to correct the data? Ideally …

- We'd like to have lots of low momentum runs – use TOF to separate electrons from all other particles
- There would be a range of impact positions and anglesover the face of each scintillator. Build a **LOCAL** correction for each pair of PMTs. Good intrinsic timing resolution => not much data required