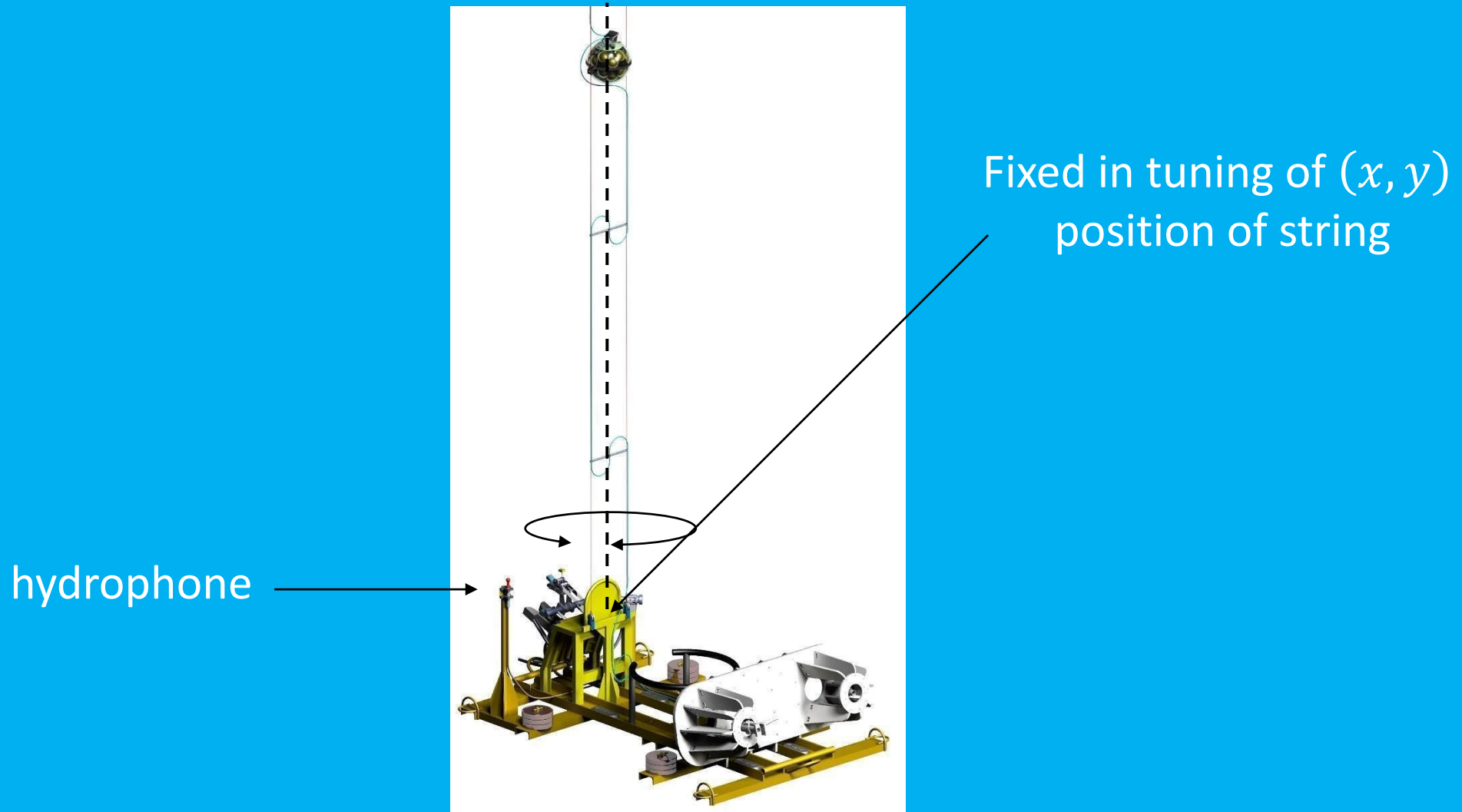


Hydrophone calibration

M. de Jong

Introduction



Procedure (I)

- Run acoustic event builder
 - JAcousticsEventBuilder.sh <detector file> <run number>
 - creates[¶]
 - <toashort file> KM3NeT_DDDDDDDDD_RRRRRRRR_toashort.root
 - <event file> KM3NeT_DDDDDDDDD_RRRRRRRR_event.root
- Run global fit procedure
 - JKatoomba.sh <detector file> (event file)+ <katoomba file>

[¶] DDDDDDDD and RRRRRRRR correspond to detector identifier and run number, respectively.

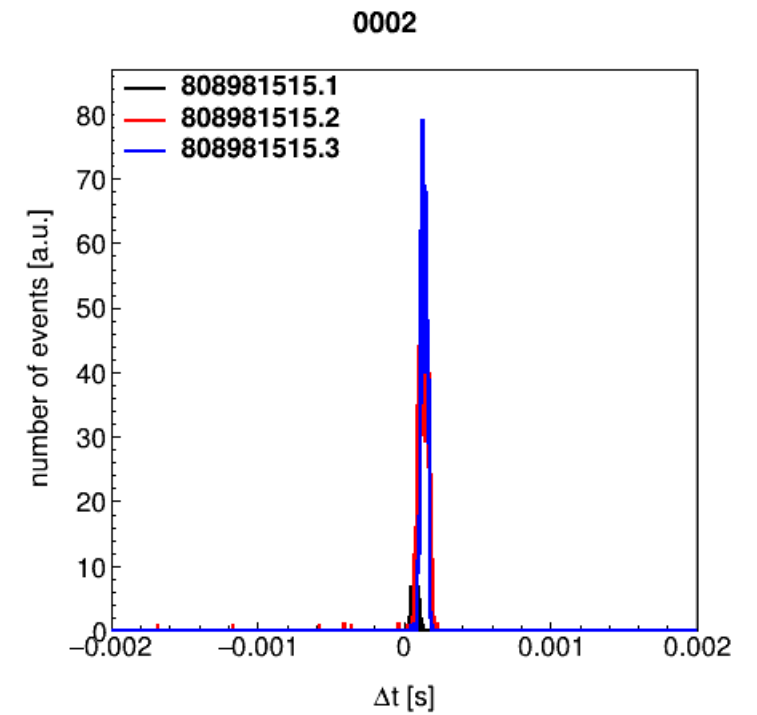
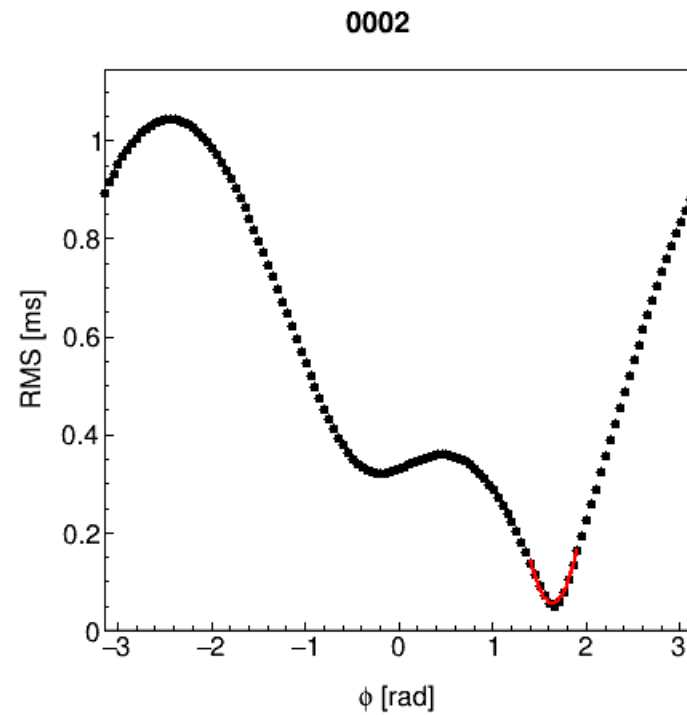
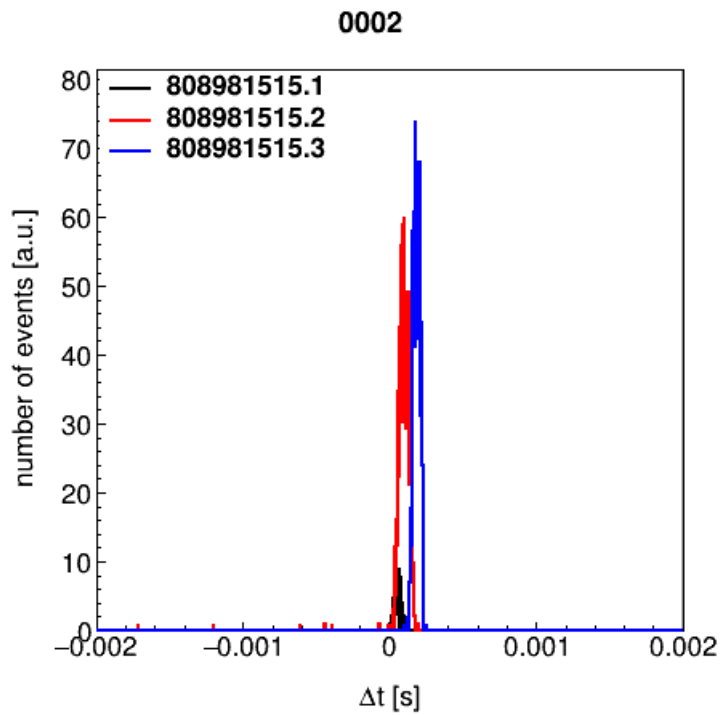
Procedure (II)

- Run example script `<Jpp>/examples/JAcoustics/JHydrophone.sh`
 - `JHydrophone.sh <detector file> <katoomba file> <toashort file>`
 - `JBaseWriter -a <detector file>` # writes base module (x, y, z) and t_0
 - `JHydrophone -f <katoomba file> -i <toashort file>` # creates histograms
- see [presentation](#) on 3 September 2020

Tuning of meta data (I)

- extended suite of scripts at [<Jpp>/examples/JAcoustics/](http://jpp.org.uk/examples/JAcoustics/)
 - hydrophone-phi:(run|plot|fit).sh # rotation of single string
 - hydrophone-t0:fit.sh # common time offset
- data
 - ORCA detector D_ORCA006 (serial number 49);
runs 7600–7610

String 0002



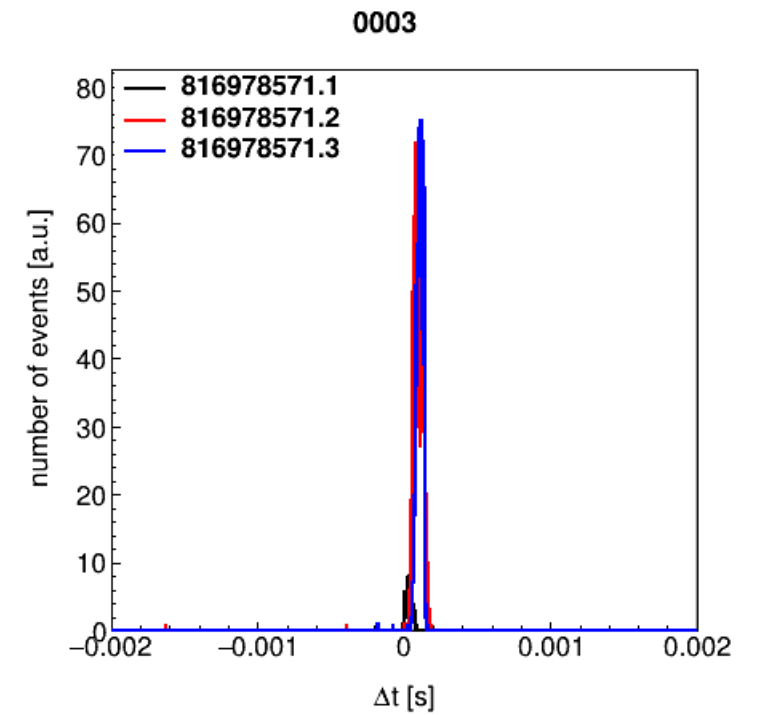
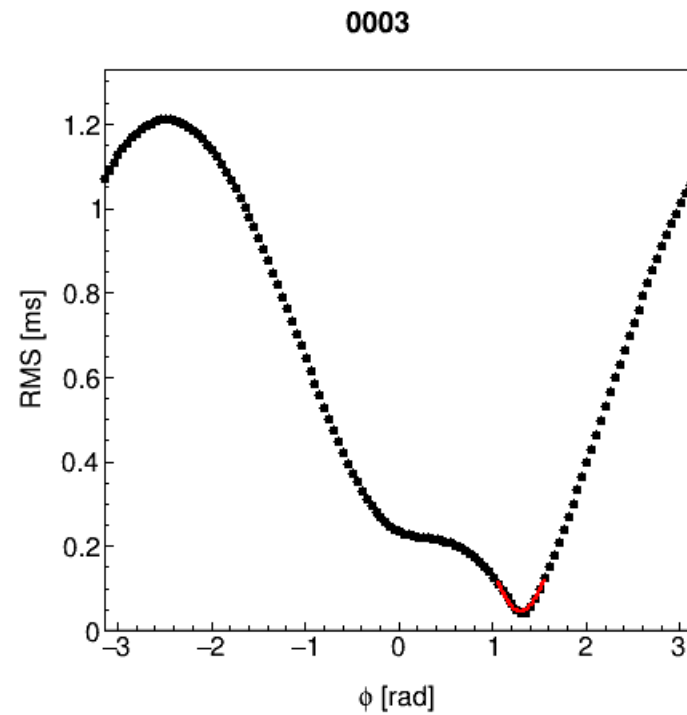
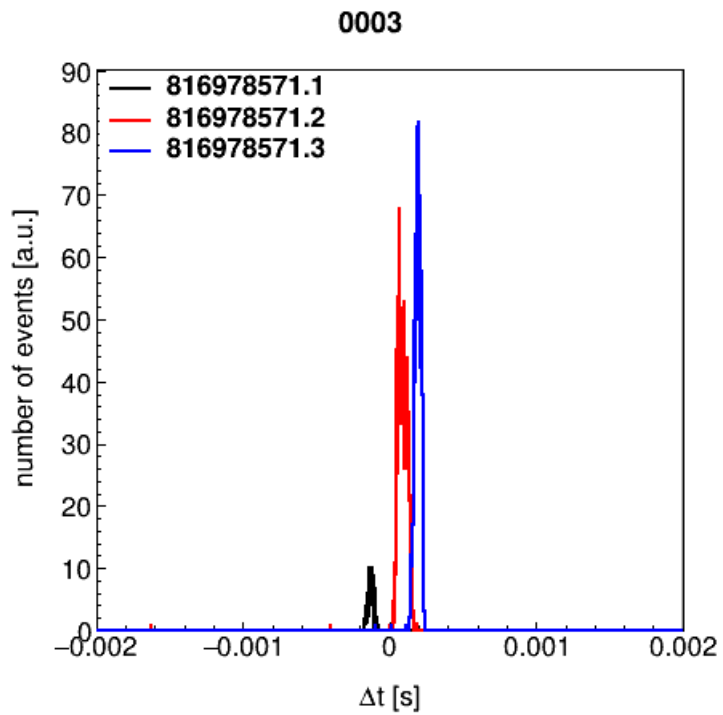
2 0 0.0 1.1 0.0
 $\varphi = +90$ deg

← sea operation

fit ⇒

2 0 -0.080 1.097 0.000
 $\varphi = +94$ deg

String 0003



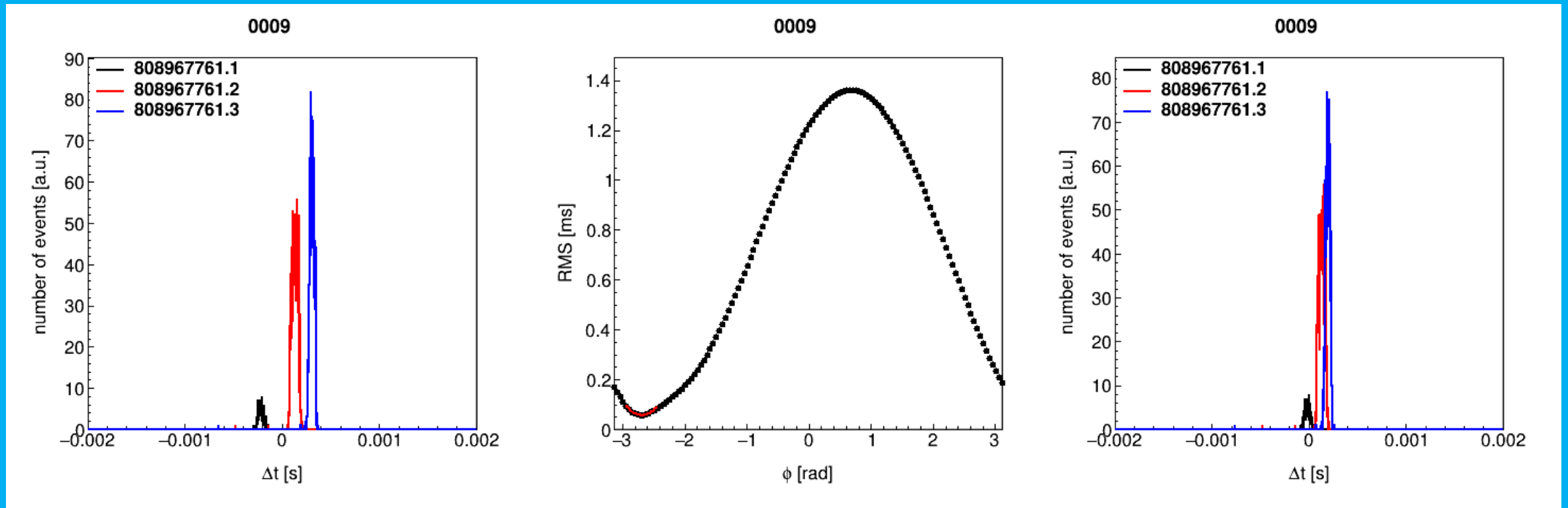
3 0 0.5 0.9 0.0
 $\varphi = +61$ deg

← sea operation

fit ⇒

3 0 0.289 1.061 0.000
 $\varphi = +74$ deg

String 0009



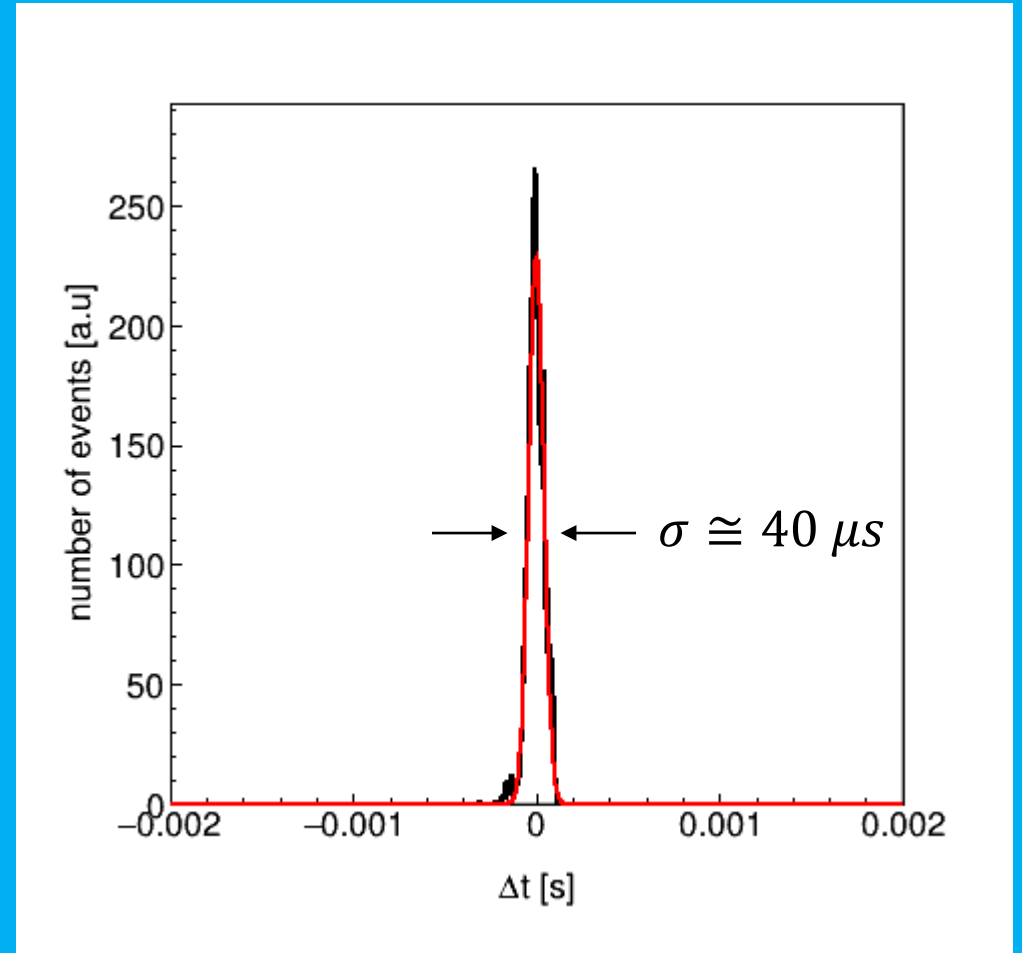
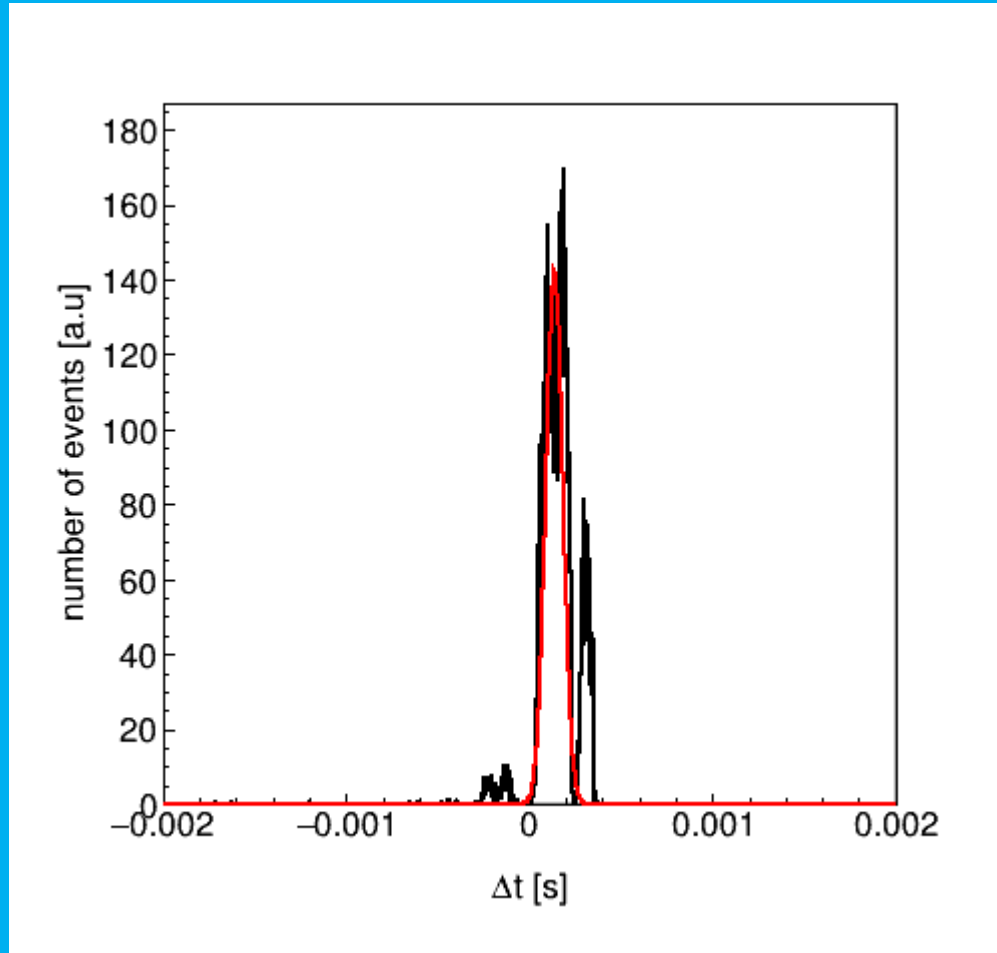
9 0 -0.7 -0.7 0.0
 $\varphi = -135$ deg

← sea operation

fit ⇒

9 0 -0.988 -0.484 0.000
 $\varphi = -154$ deg

t0



Conclusions & Outlook

- Orientation of anchor can be tuned with available data
 - 5–20 degrees adjustments seem to improve overall alignment
 - string 9 may need adjustment of (x, y) position
 - overall resolution $\sigma \cong 40 \mu s$
- Additional time offset of about $125 \mu s$
 - difference between piezo sensor and hydrophone delay?
 - time offset of optical module \equiv average time offset of PMTs[¶]
 - time offset of base module $\equiv 0 \mu s$
 - delay time of piezo sensor $\equiv 170 \mu s$
 - delay time of hydrophone $\equiv 50 \mu s$

[¶] $\langle t_0 \rangle \cong 200 \mu s$.