EICROC activity @ HU
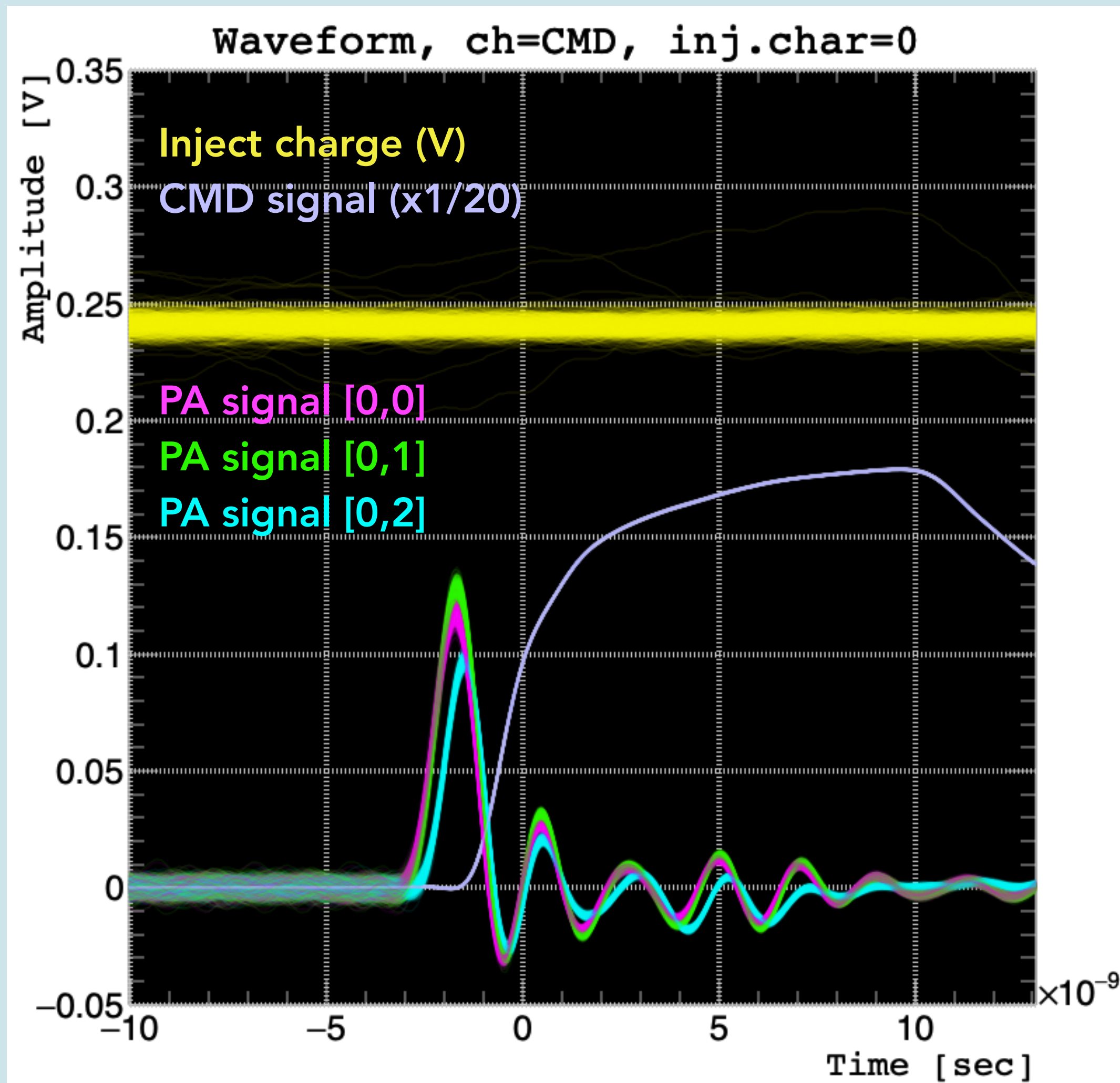
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Analog block analysis

Waveform, ch=CMD, inj.char=0

Inject charge (V)
CMD signal (x1/20)
PA signal [0,0]
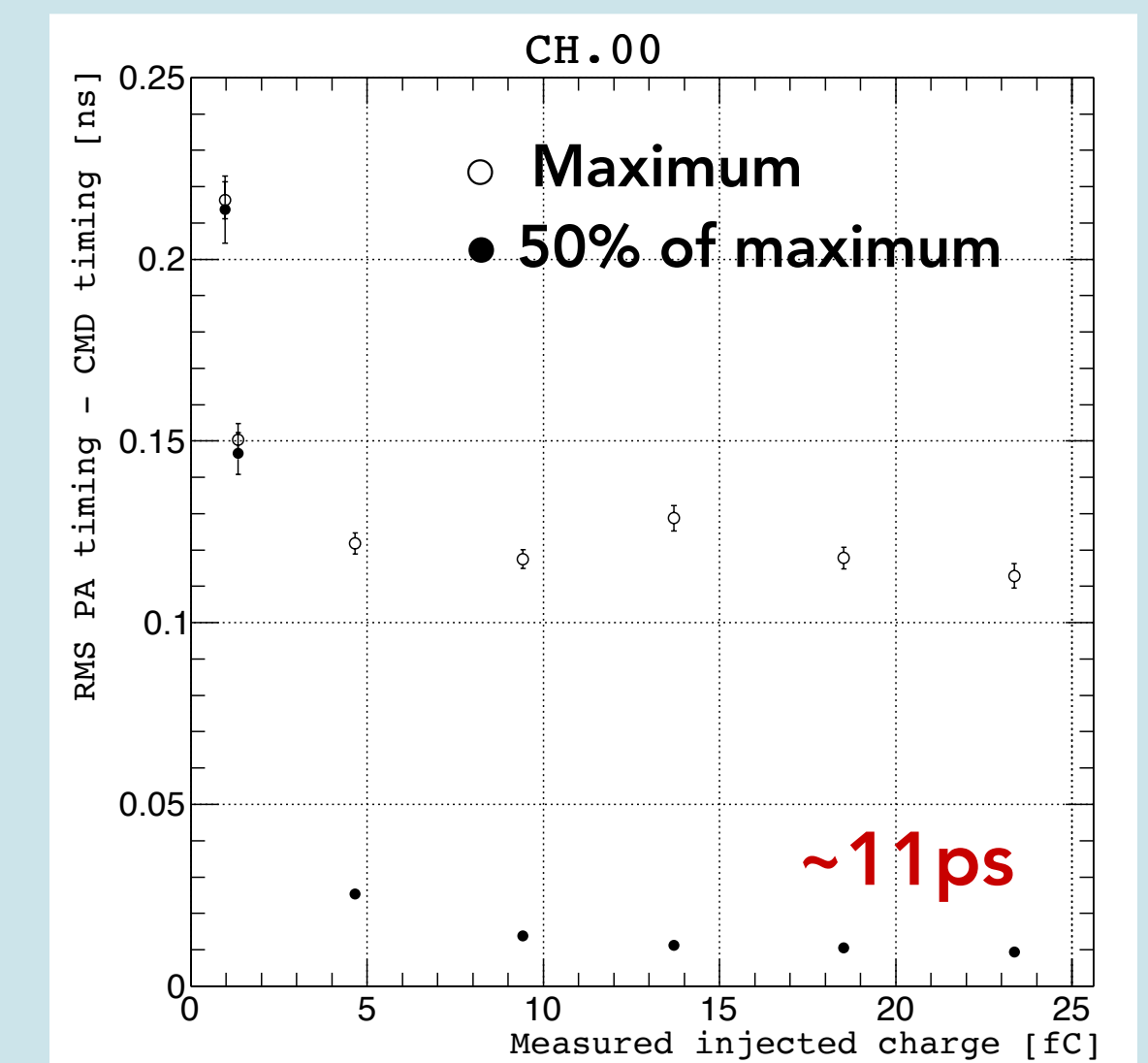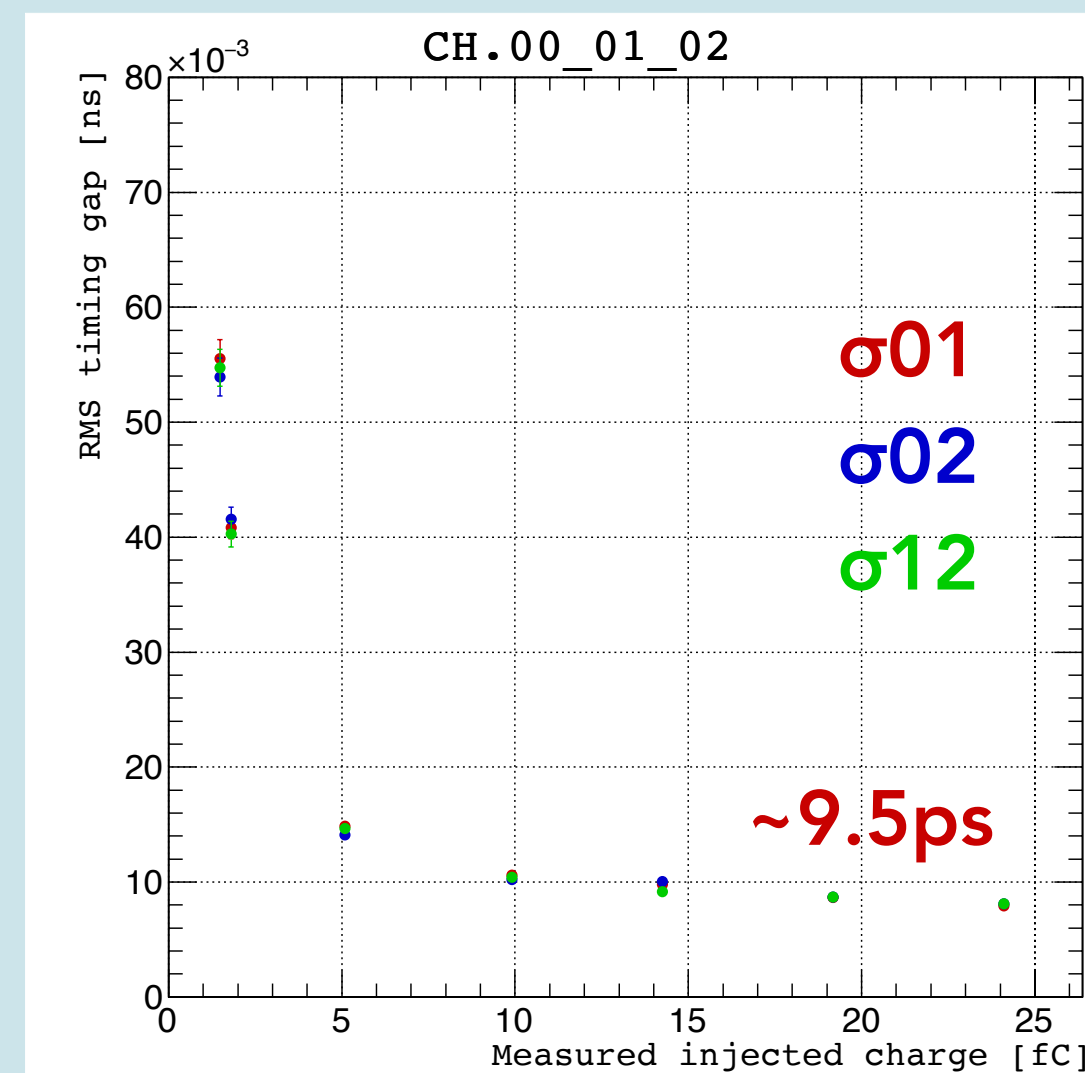PA signal [0,1]
PA signal [0,2]

- Several charges are injected into pixels (0,0) (1,0) and (2,0) simultaneously
- Injected charge is measured from the J5 connector
- CMD signal is used as an event trigger

- Charge is injected 1000 times each
- Measured voltage [V] is converted into charge [fC] with C=100 [fF] assumption

- Pedestal has been measured in -20 ~ -10 ns
  - Event-by-event

Timing resolution estimation by PA signal timing difference
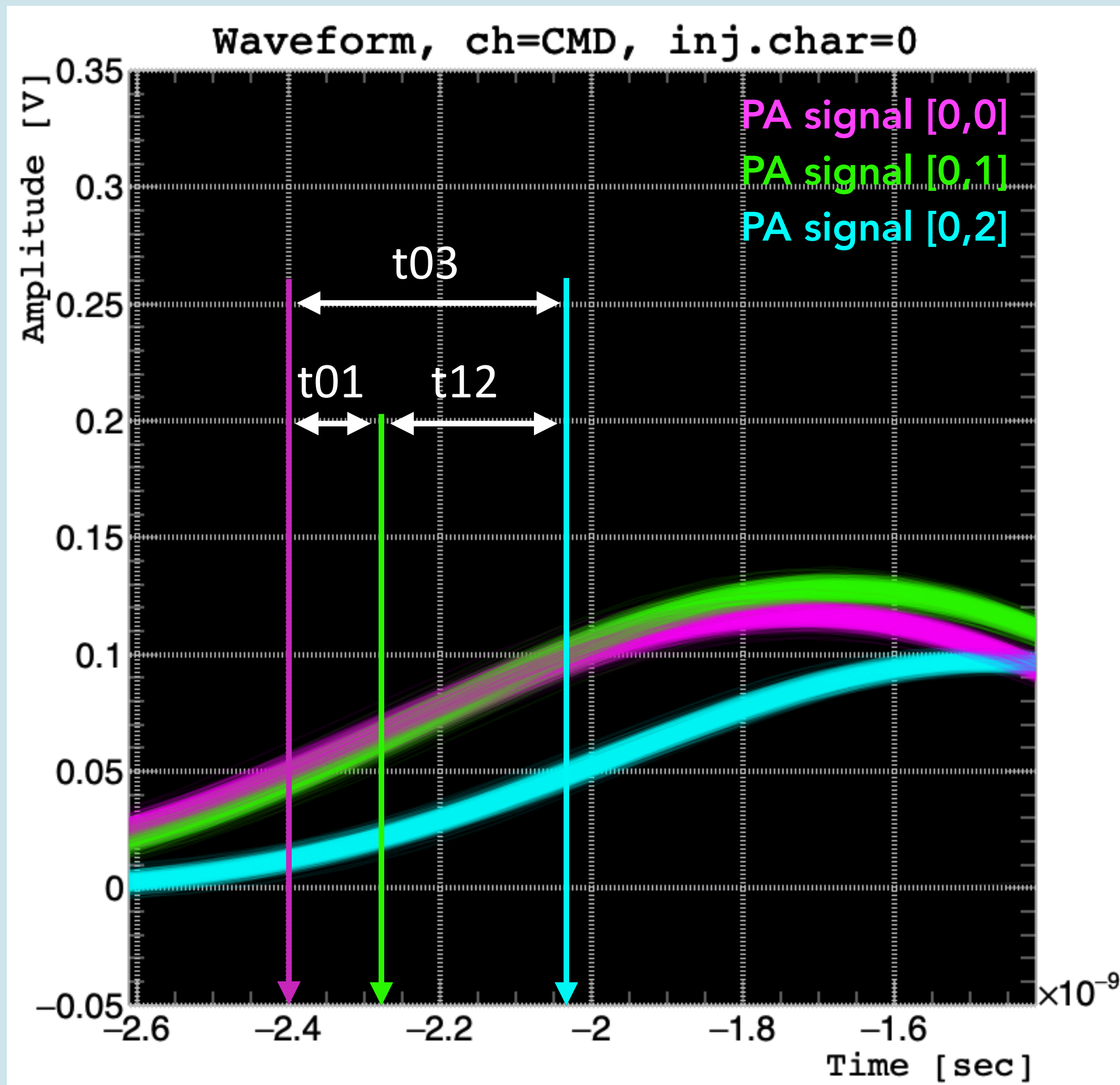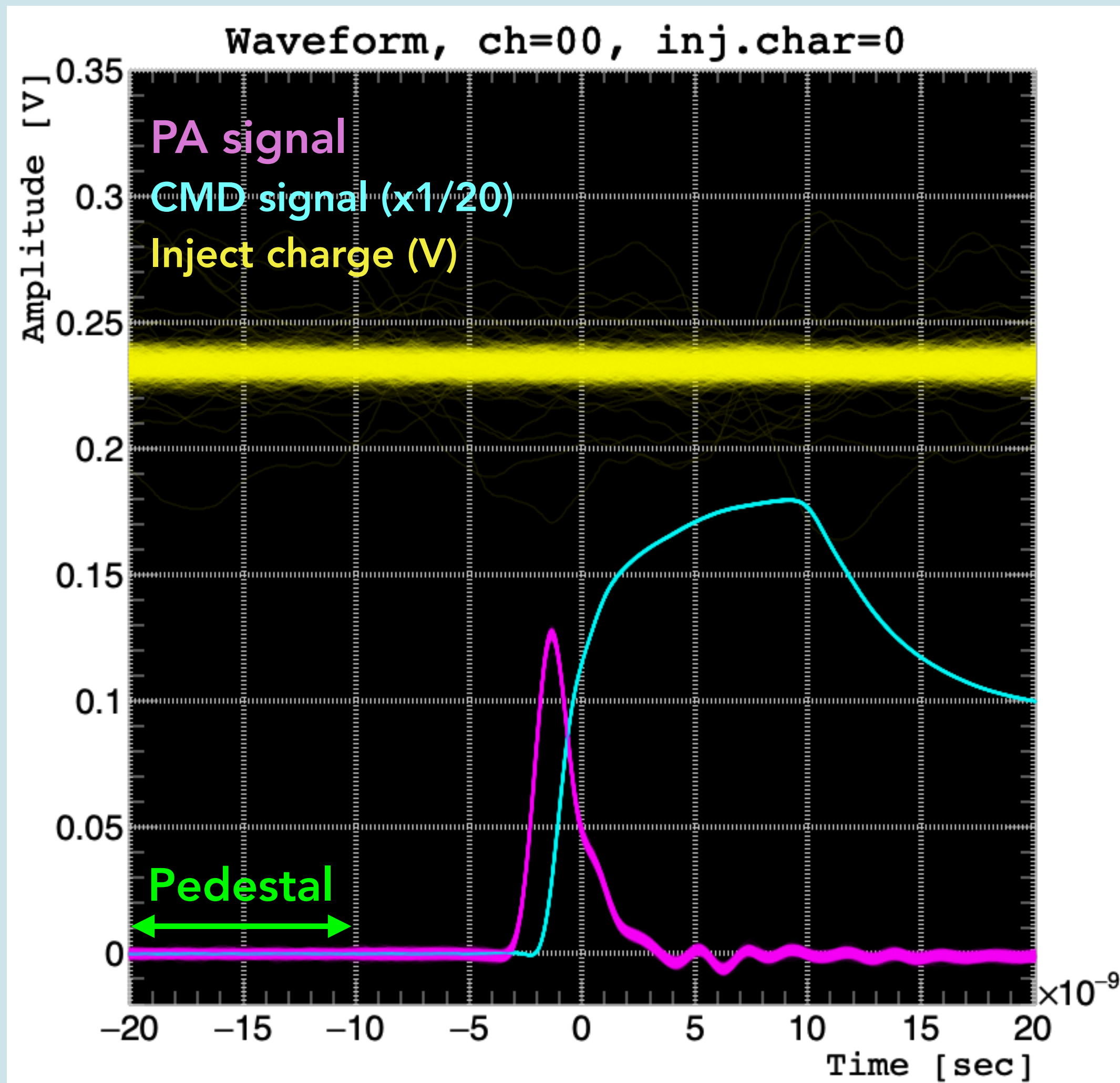

- Time difference of 50% maximum between each pixel is calculated
- The RMS is consistent with each other and it is found to be less than 10ps
 - CMD case is ~ 11ps

Backup

Analog block analysis

Waveform, ch=00, inj.char=0

PA signal
CMD signal (x1/20)
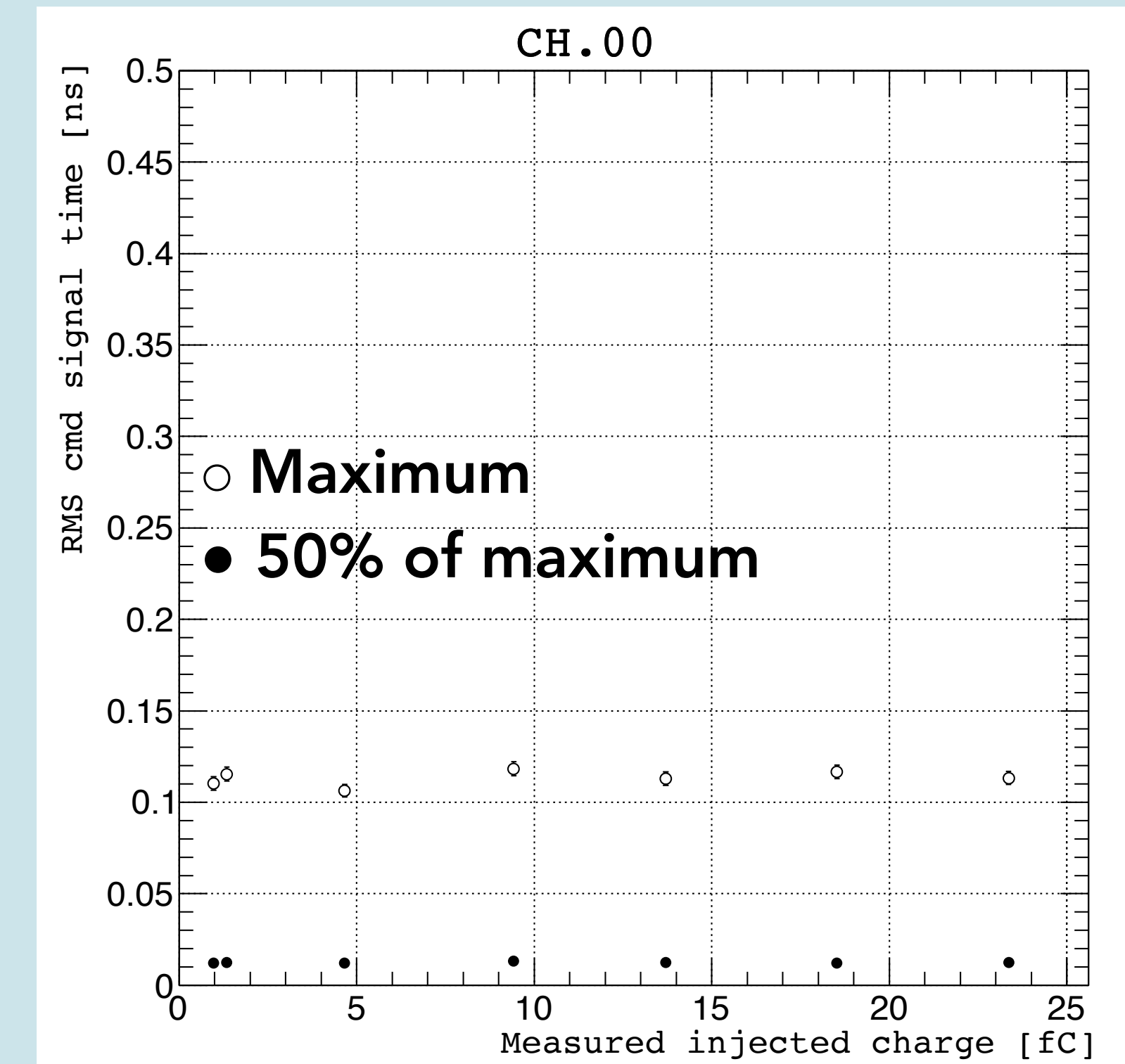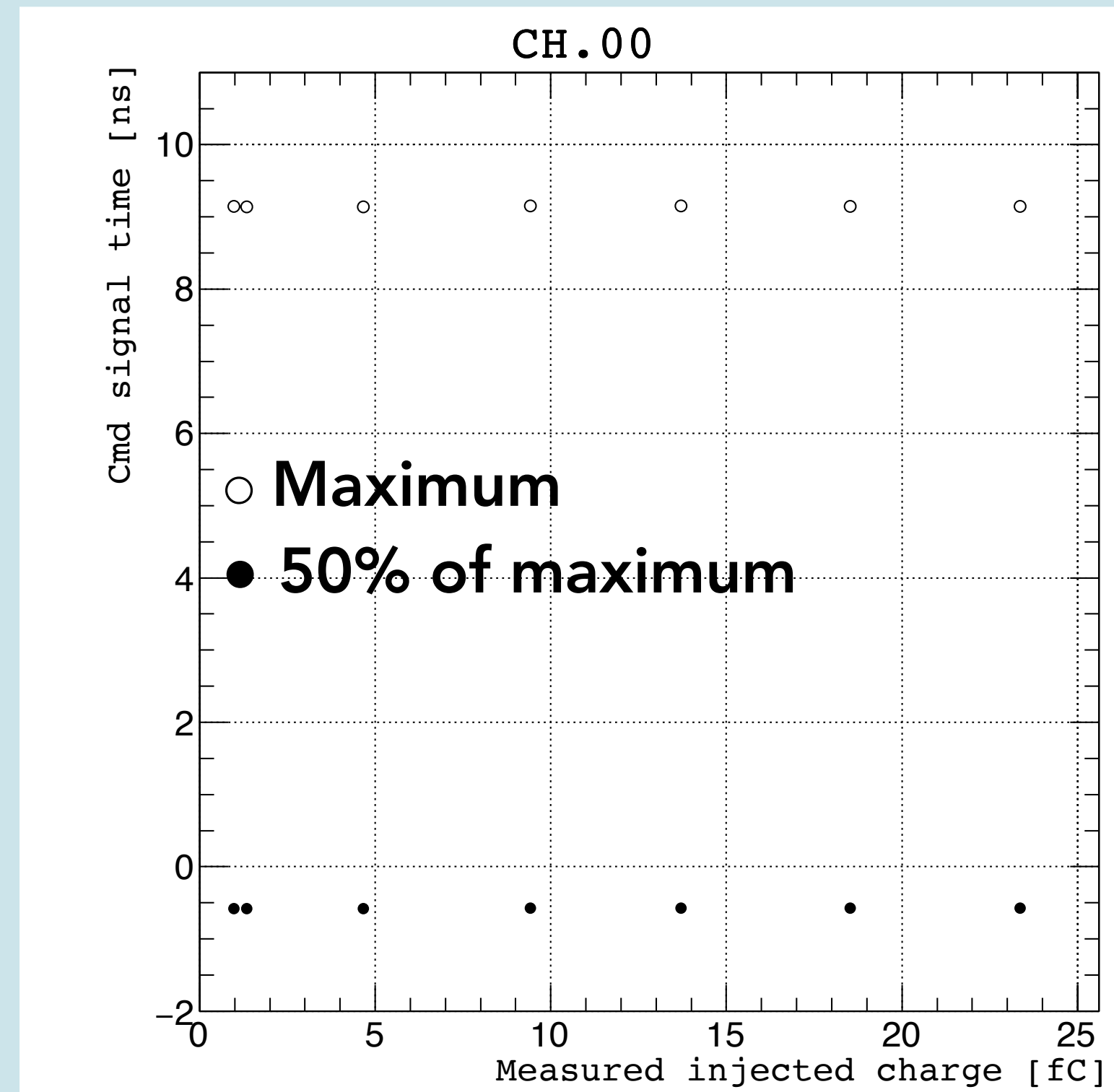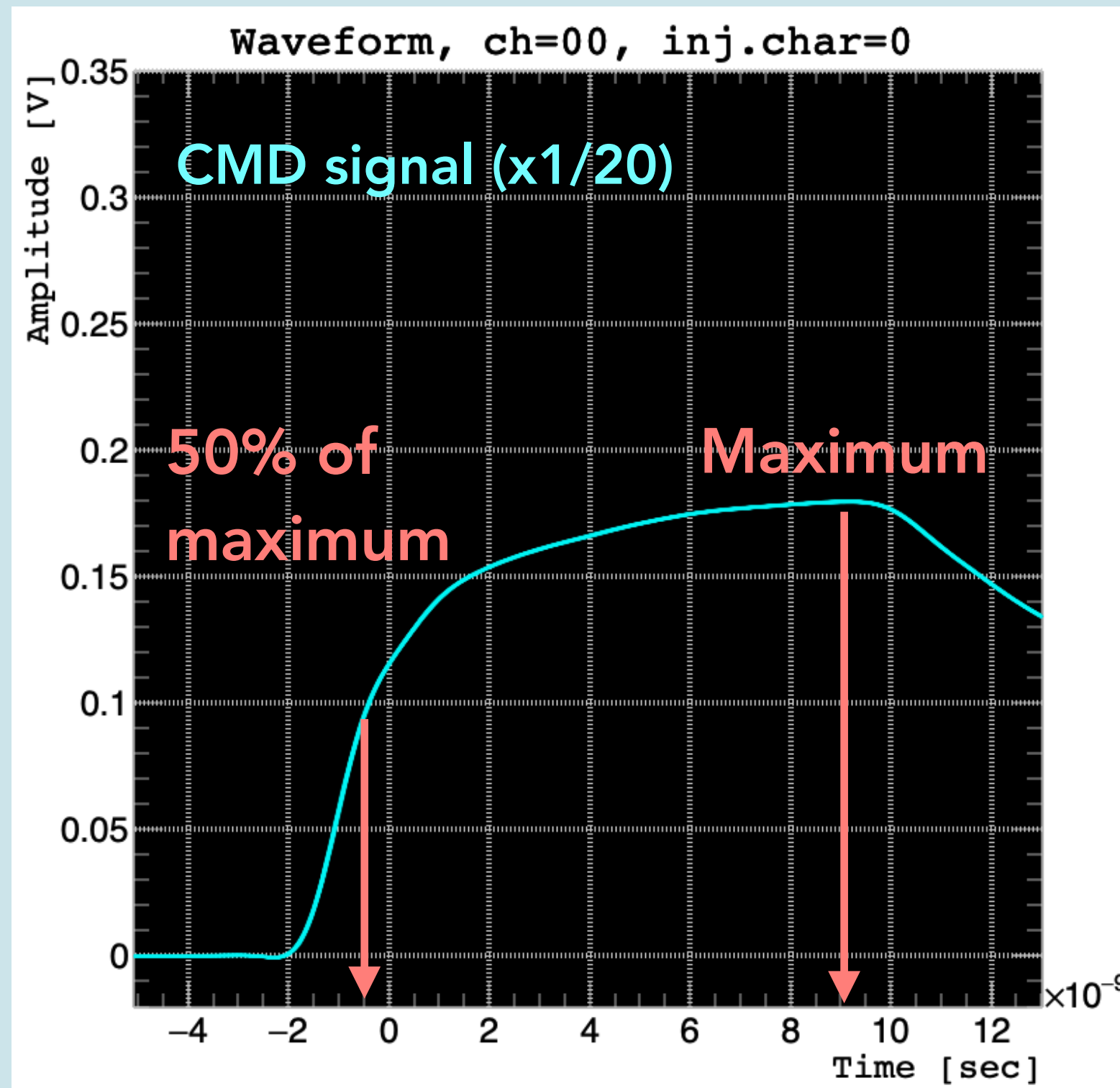Inject charge (V)

Pedestal

- Several charges are injected into pixel [0,0]
- Injected charge is measured from the J5 connector
- CMD signal is used as an event trigger

- Charge is injected 1000 times each
- Measured voltage [V] is converted into charge [fC] with C=100 [fF] assumption

- Pedestal has been measured in -20 ~ -10 ns
  – Event-by-event
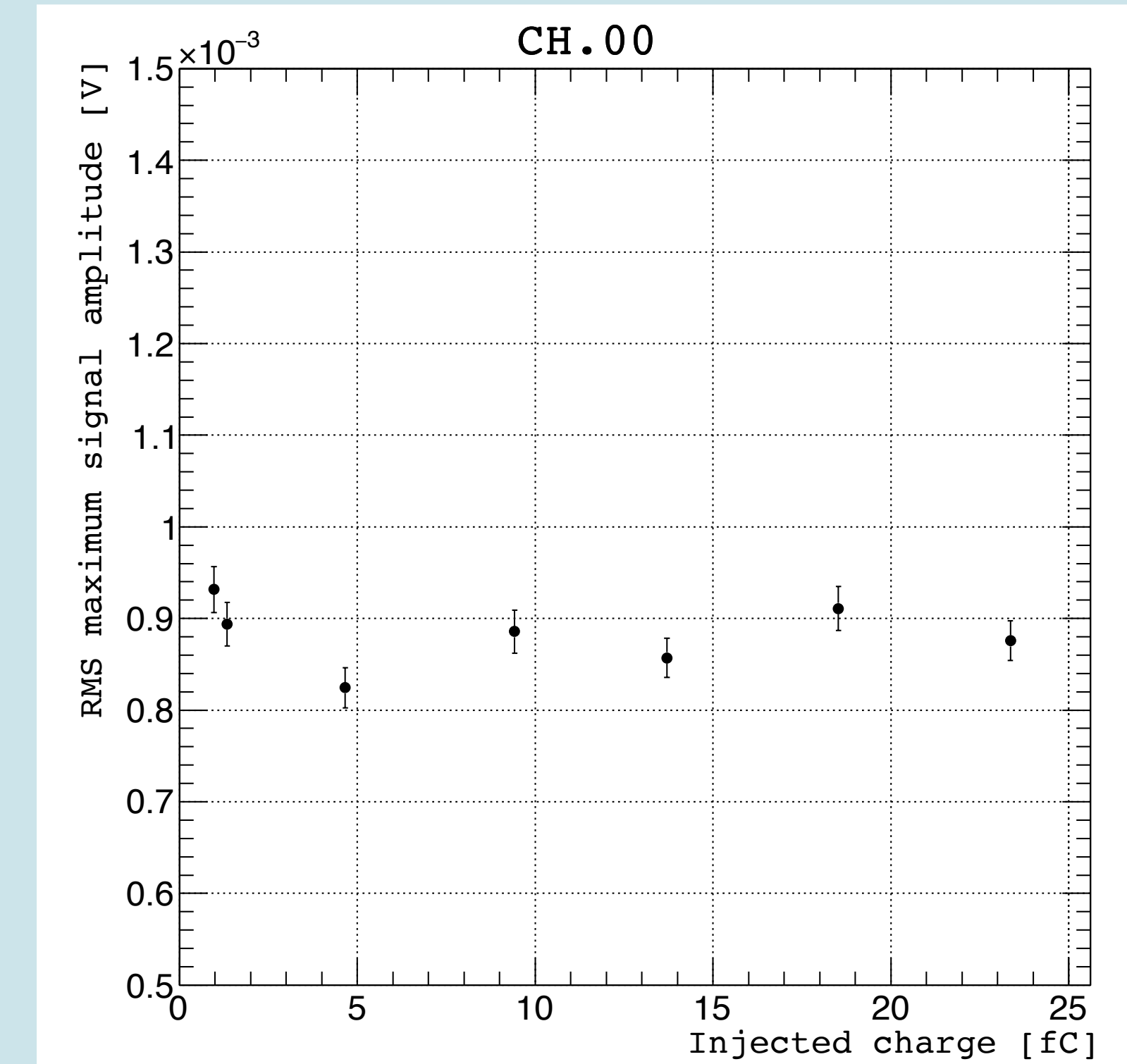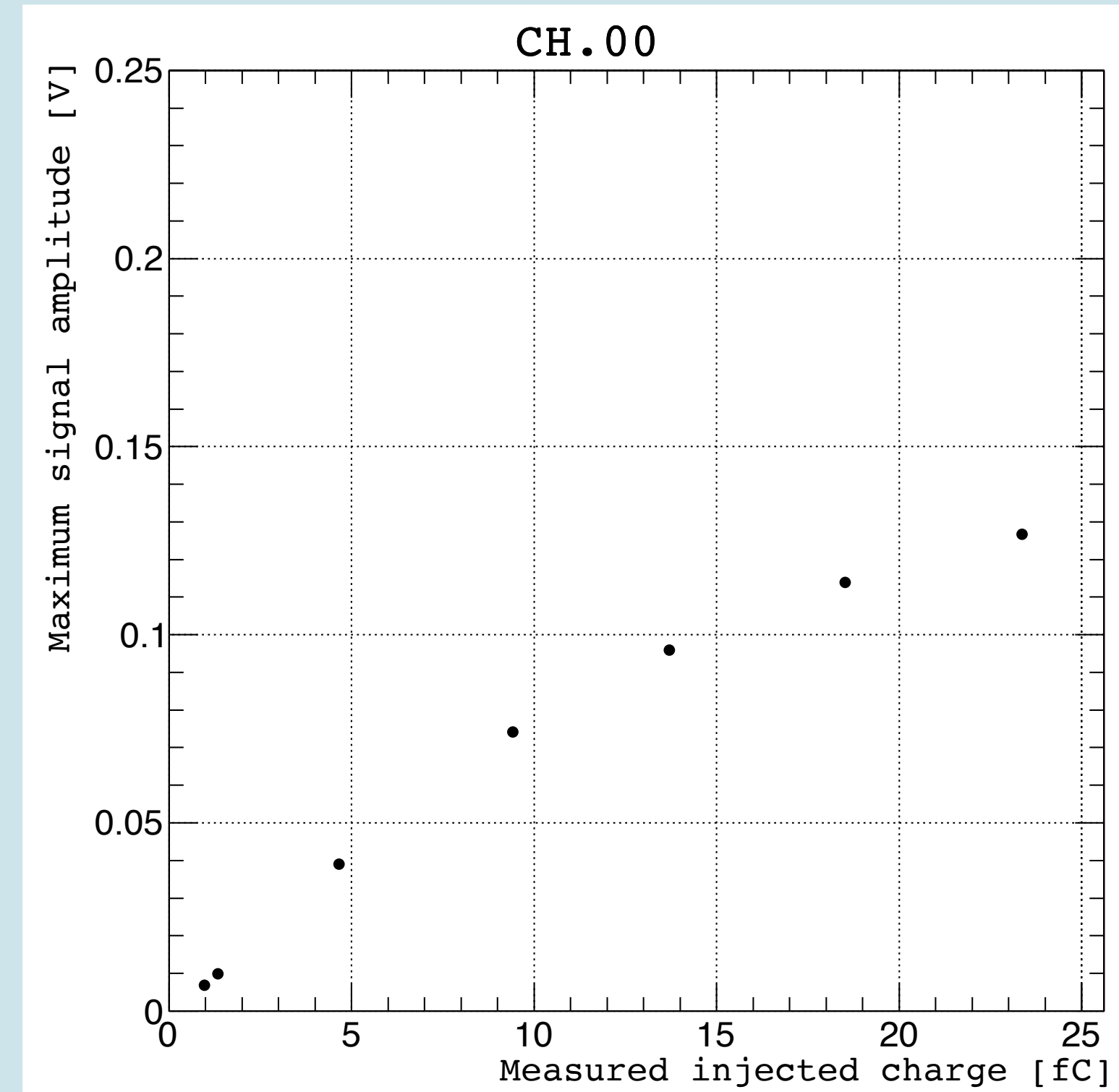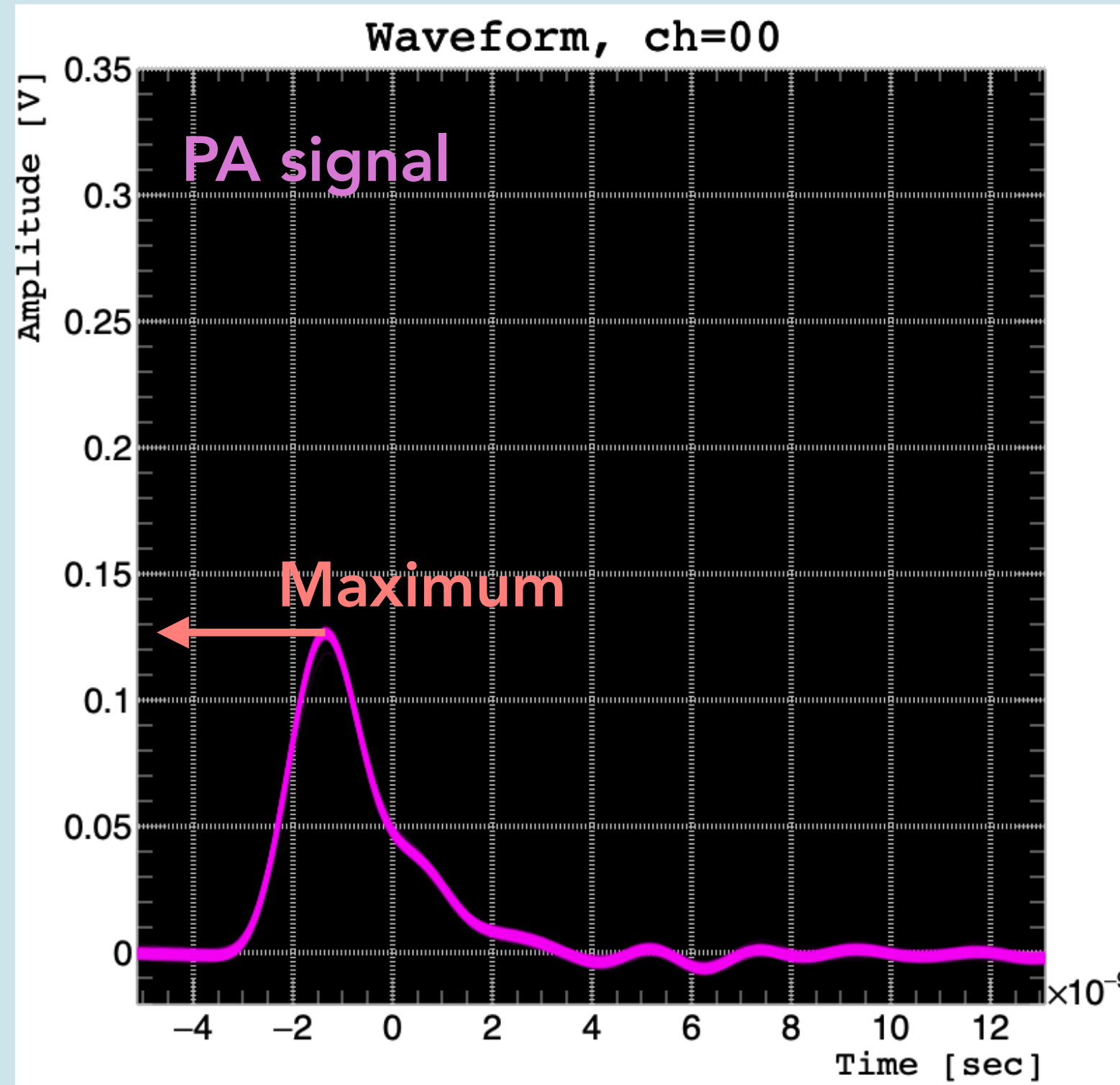
Injected charge
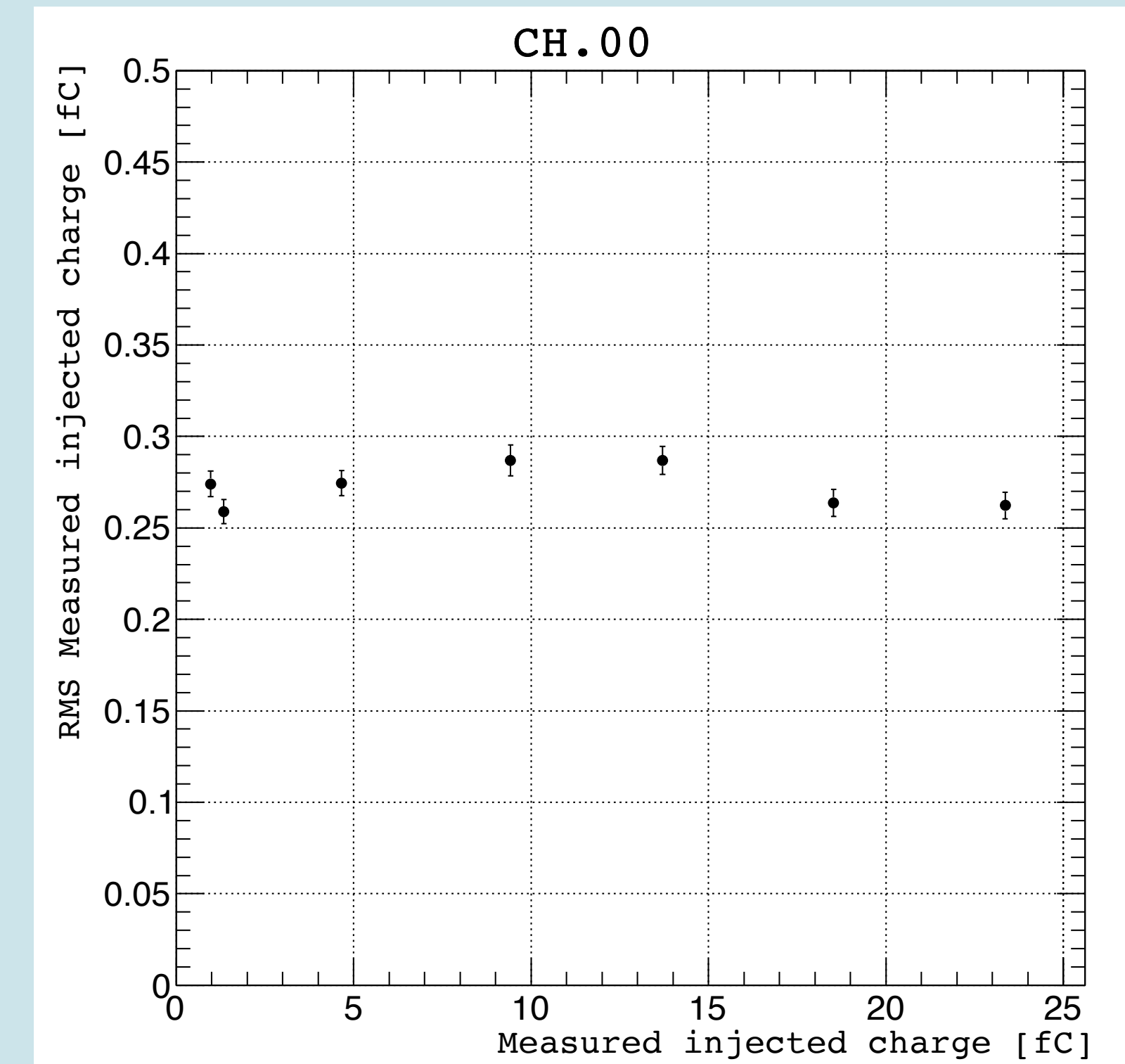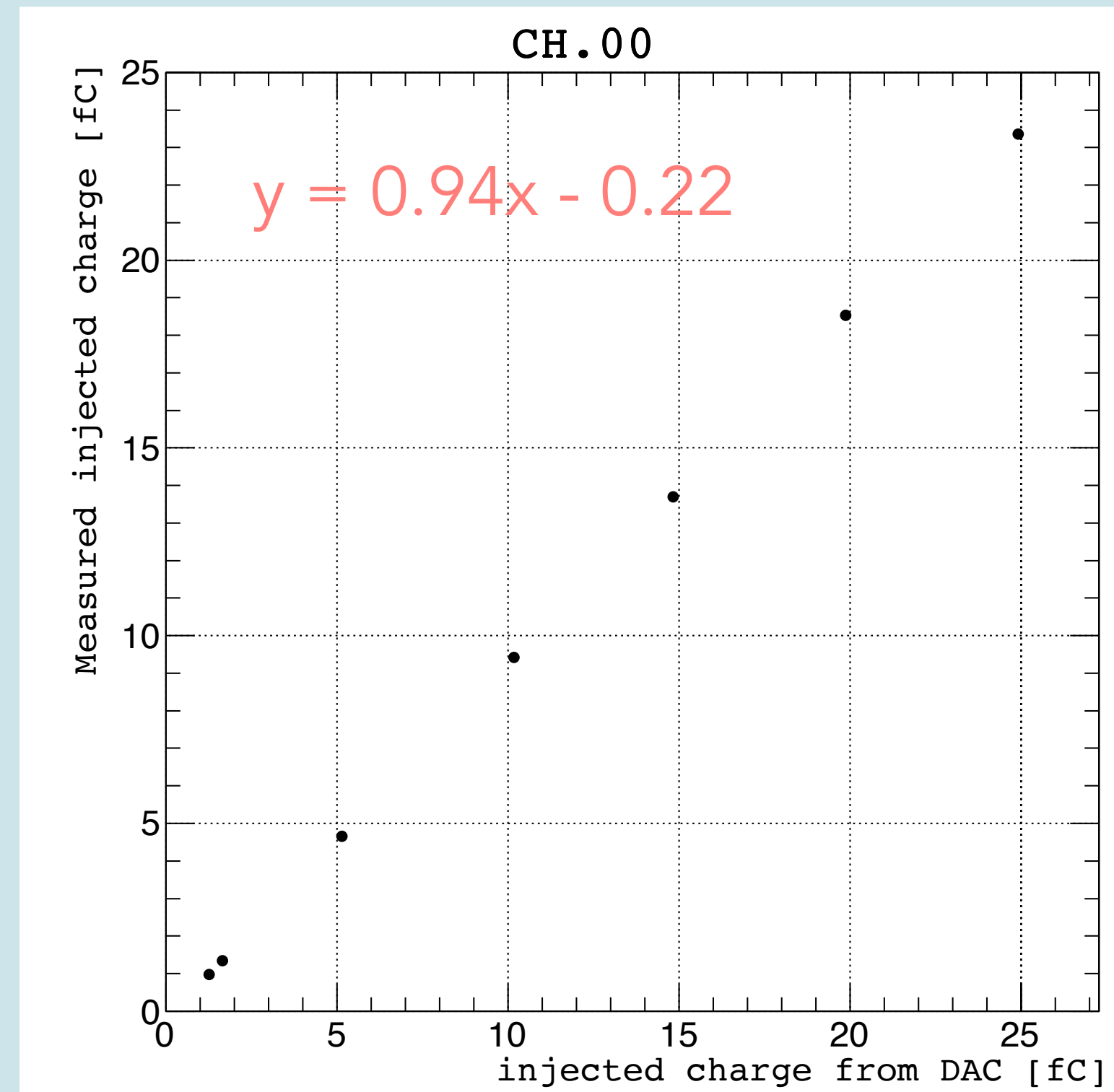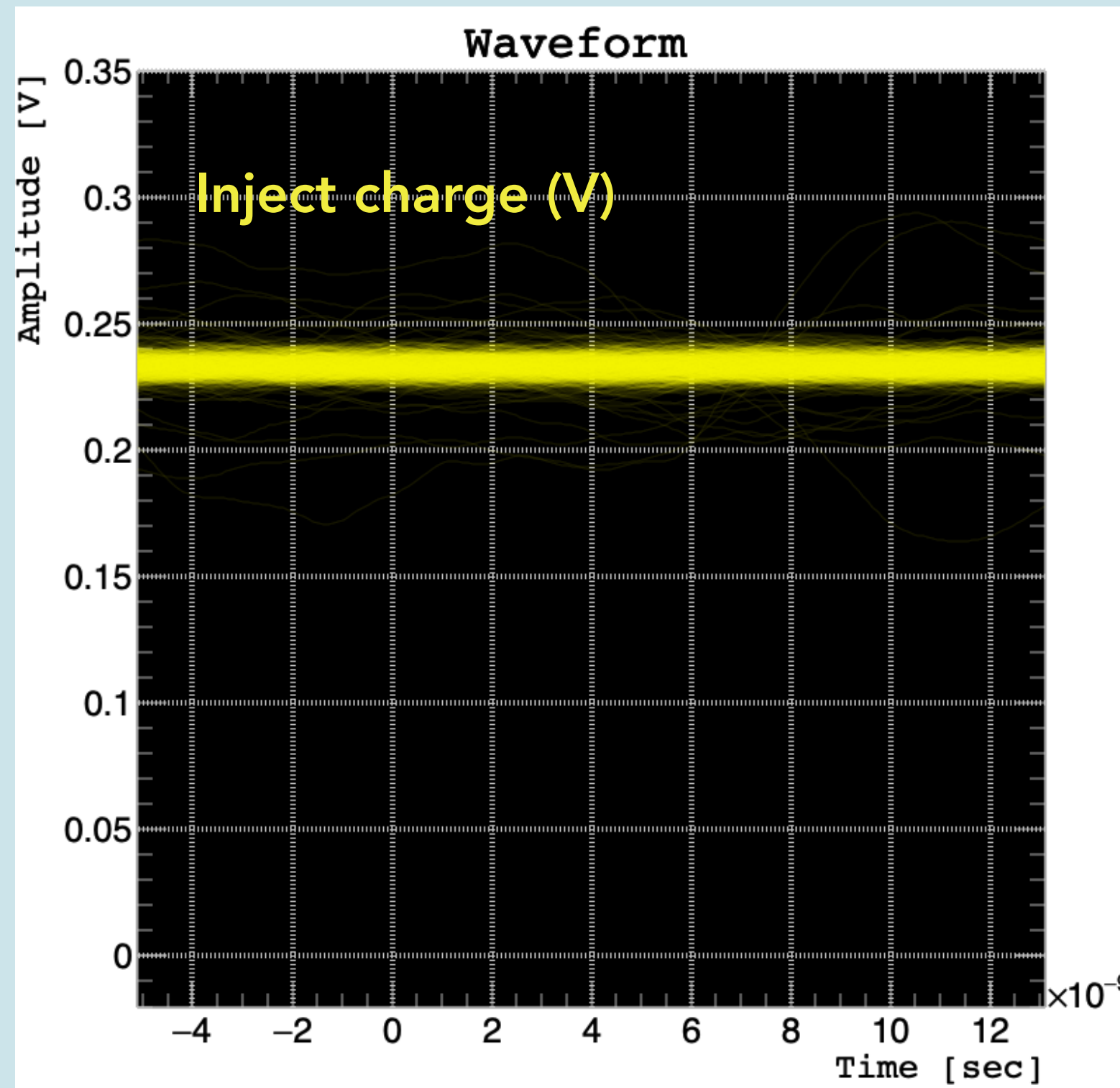
- Injected charge is measured from the J5 connector (K_in_ctest)
- The waveform is fitted by constant function (pol0) and the value is used as "measured injected charge"
- Clear linear correlation between measured and DAC values has been observed
- Measured injected charge has a fluctuation of 0.27 fC and no charge dependence has been observed

CMD signal as an event trigger

- CMD signal timing position and its RMS don't depend on the amount of injected charge
- RMS of maximum and 50% of the maximum are found to be σ~119 ps and 12 ps, respectively

# Maximum PA signal amplitude

- Signal amplitude is proportional to the injected charge but it is not the perfect linear function
- The RMS is very stable and no dependence of the amount of charge has been observed

Maximum PA signal timing
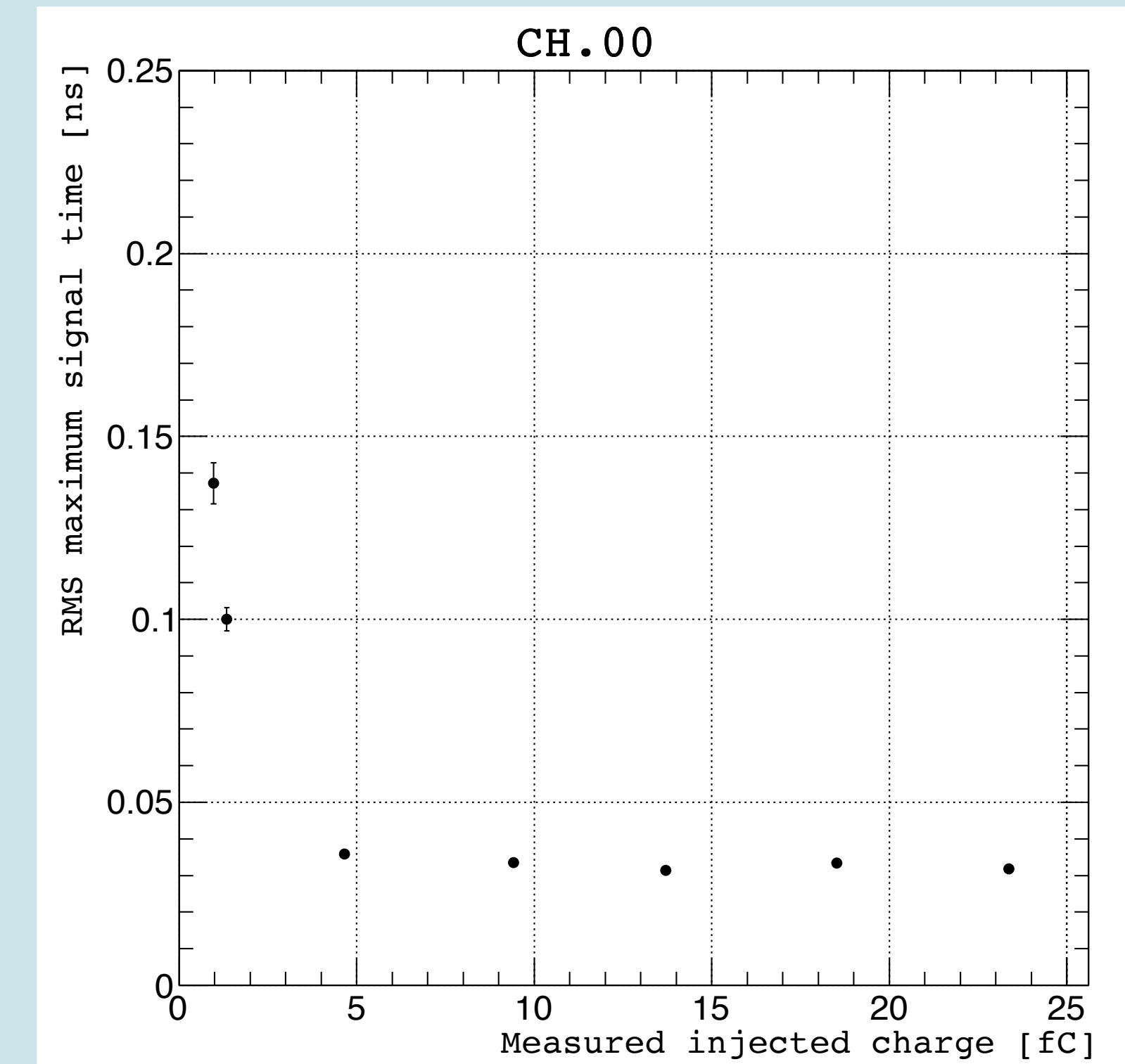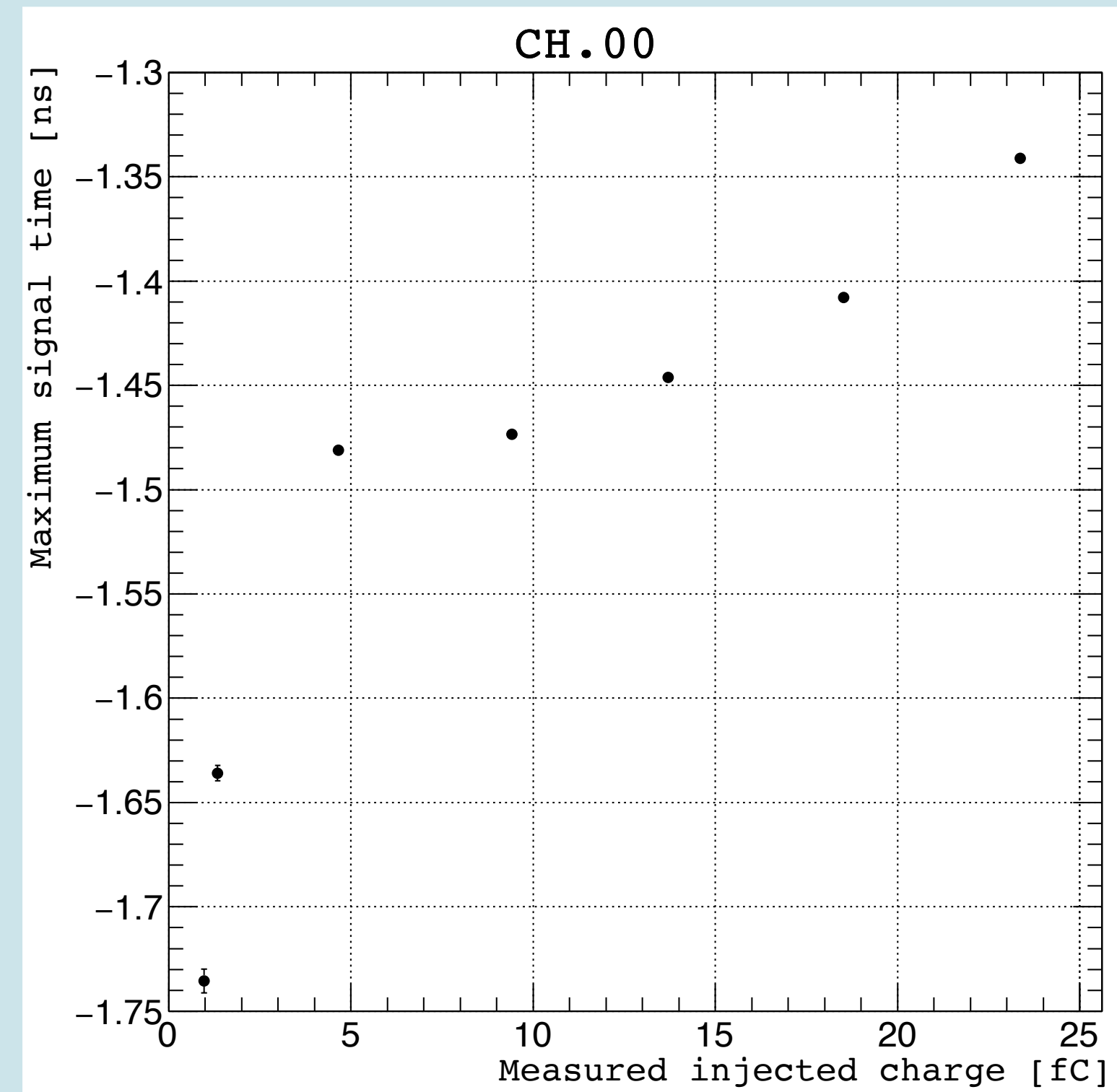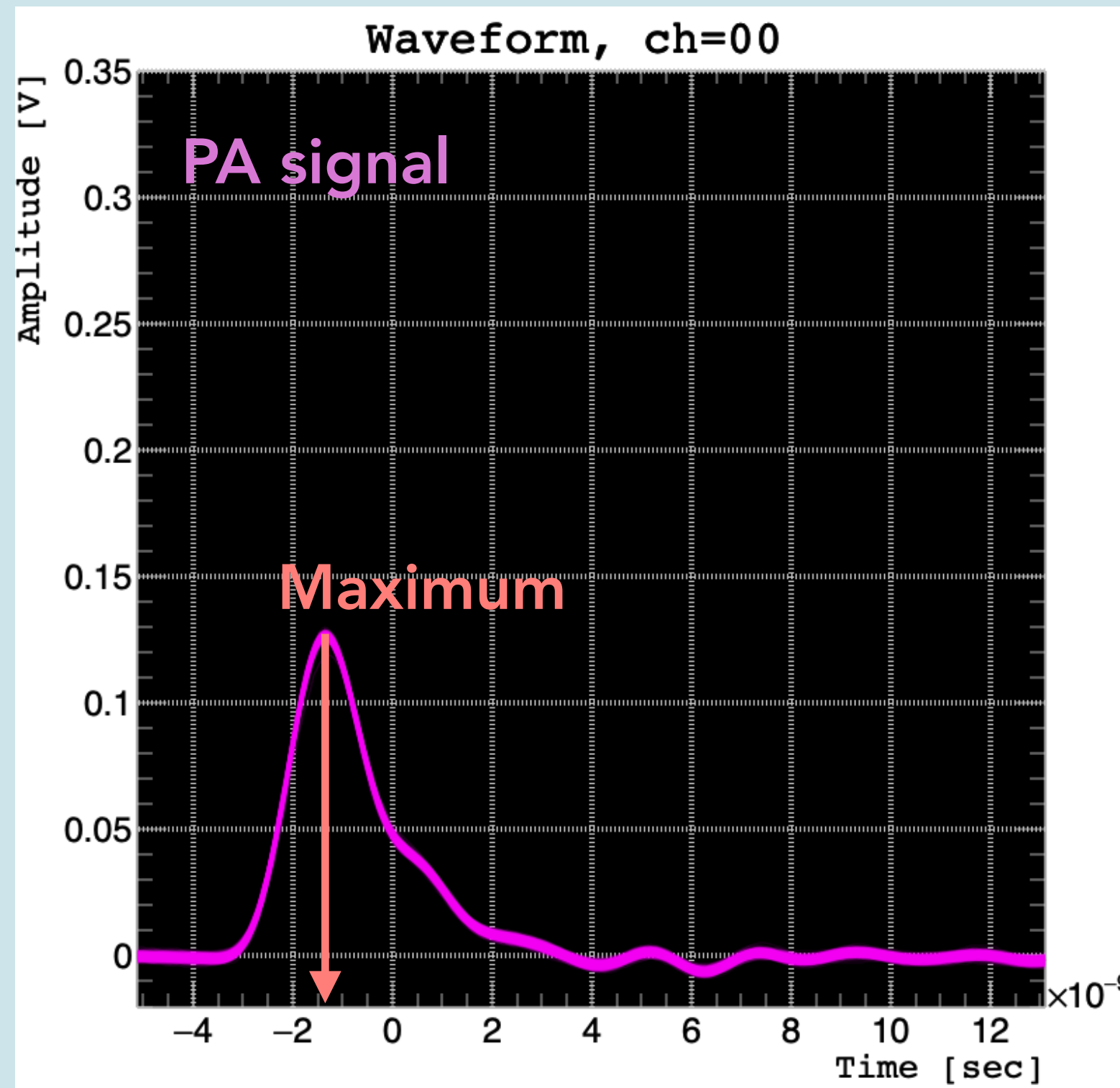
- Signal time of arrival increases rapidly for small charges and slowly for 5 fC and above
- The arrival time above 5 fC is stable and it is found to be σ~33ps (above 5 fC)
- This timing RMS is a quadratic sum of PA and charge injection timing
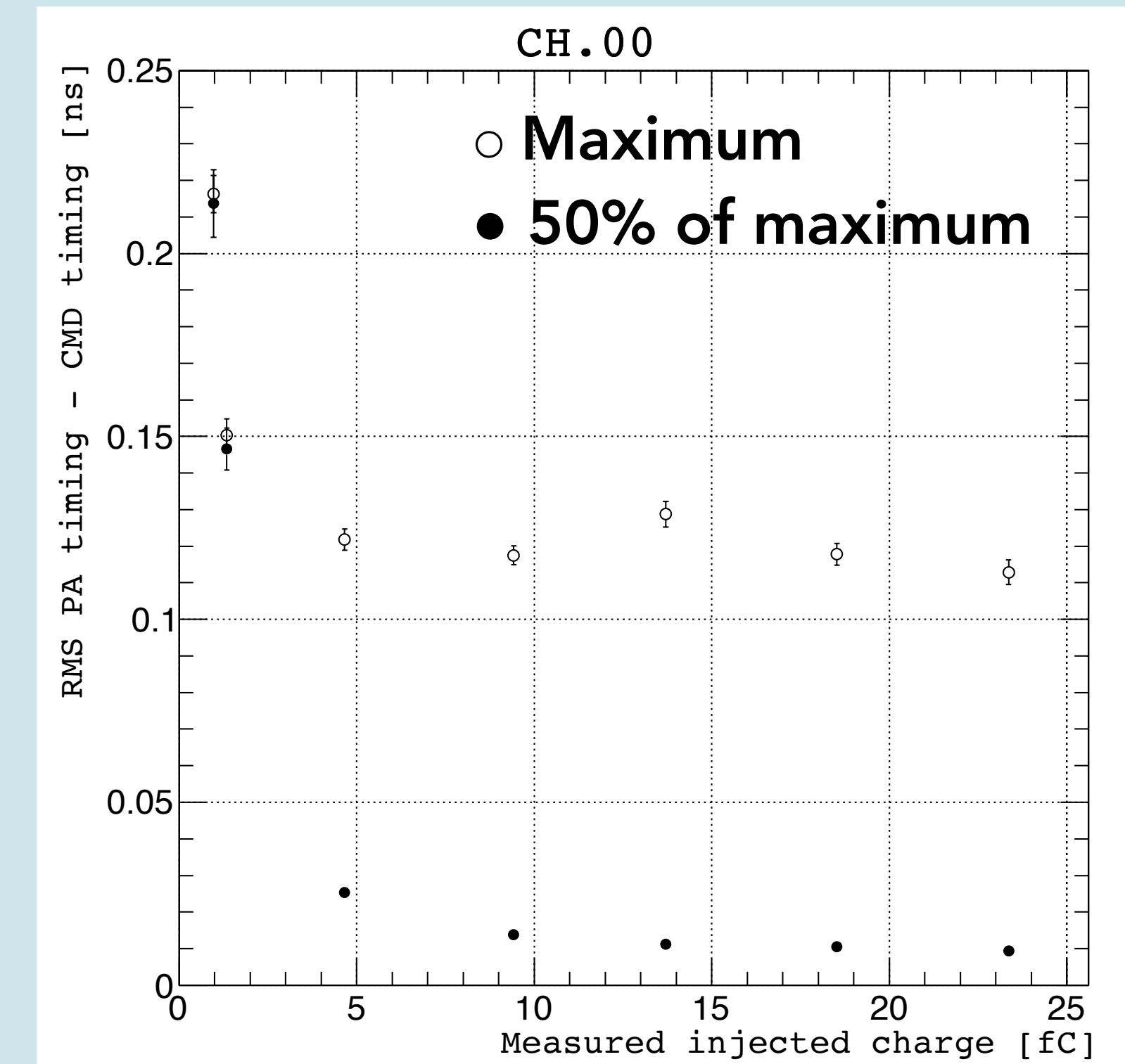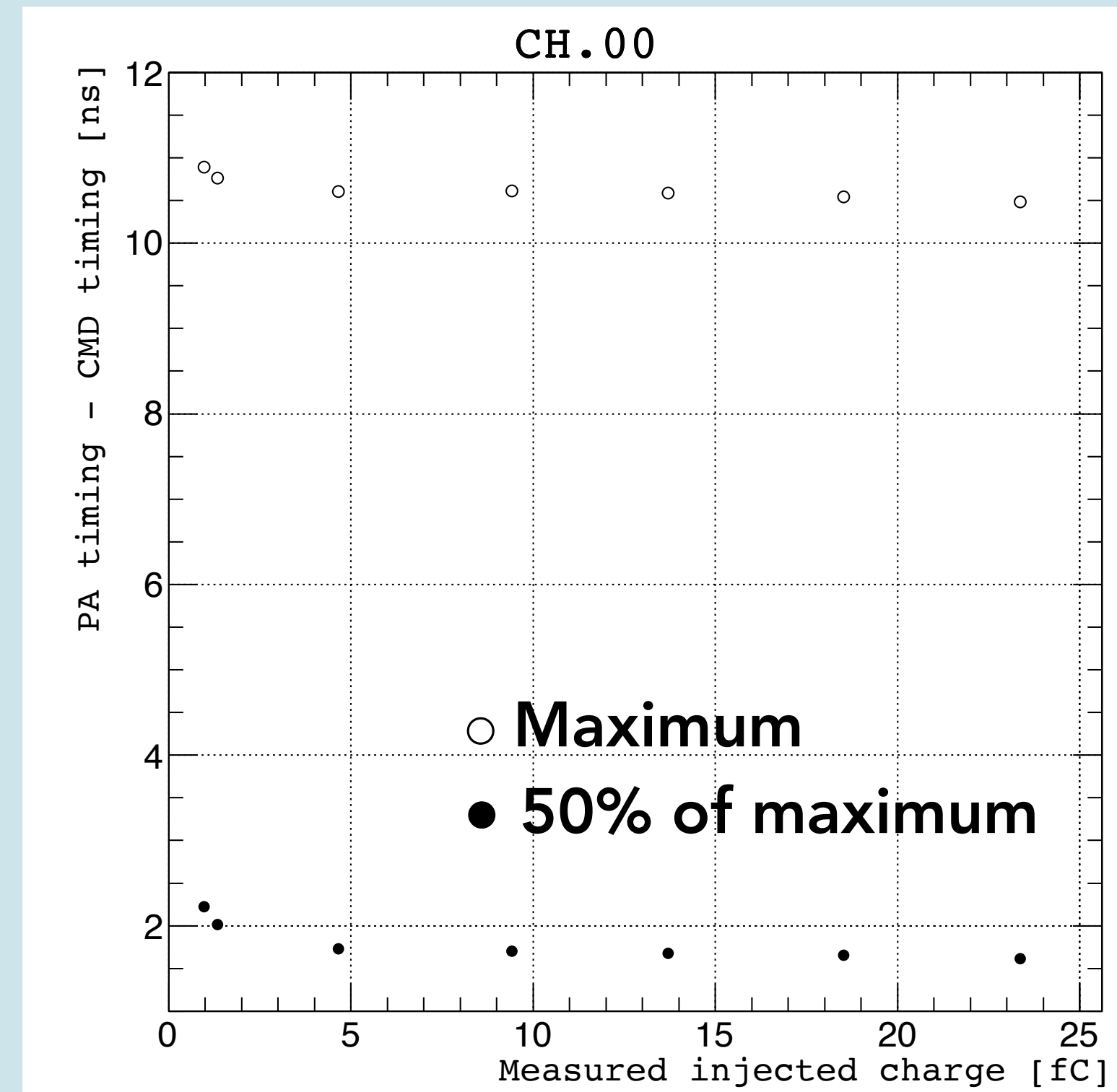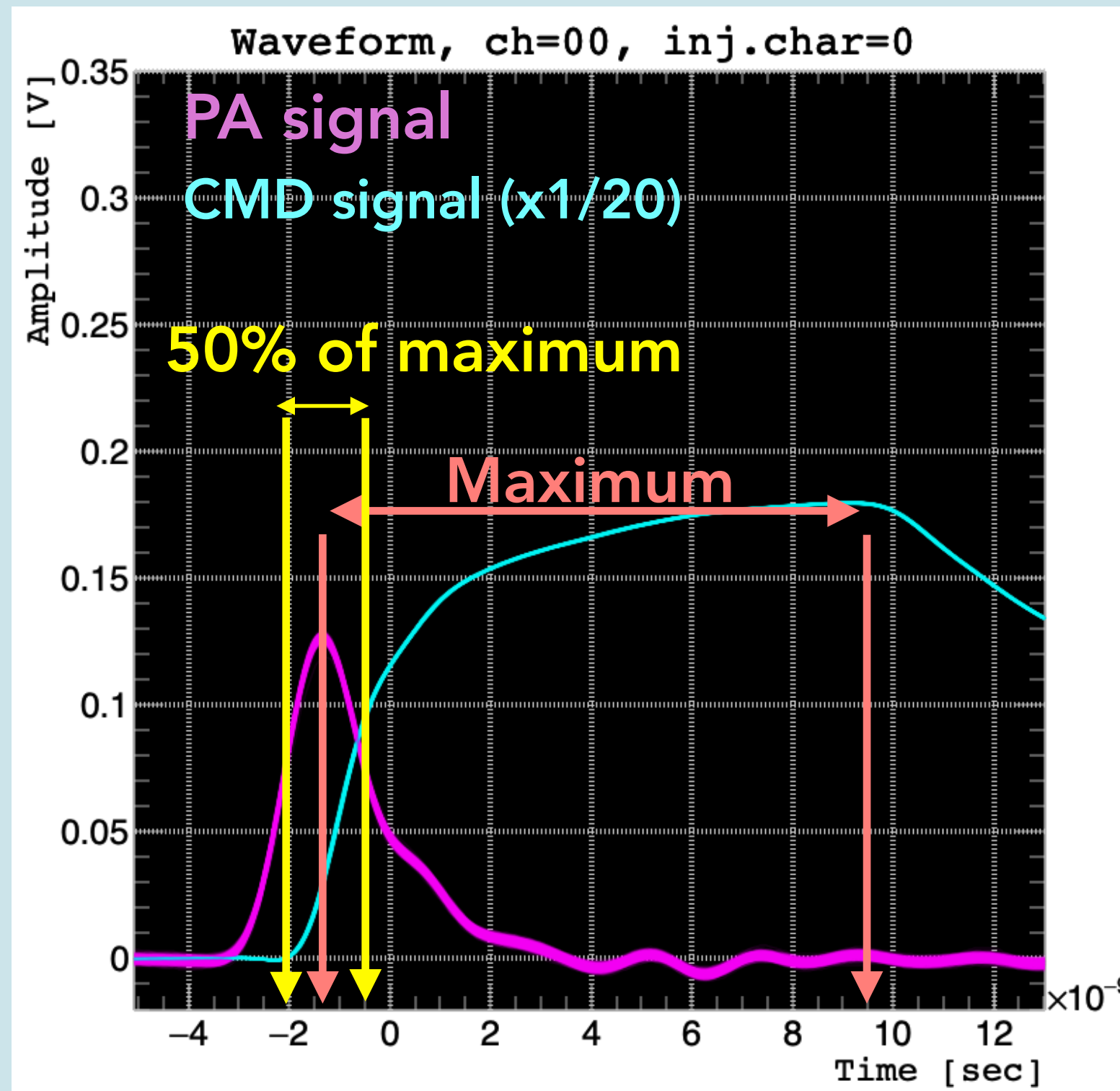
50% of maximum PA signal timing
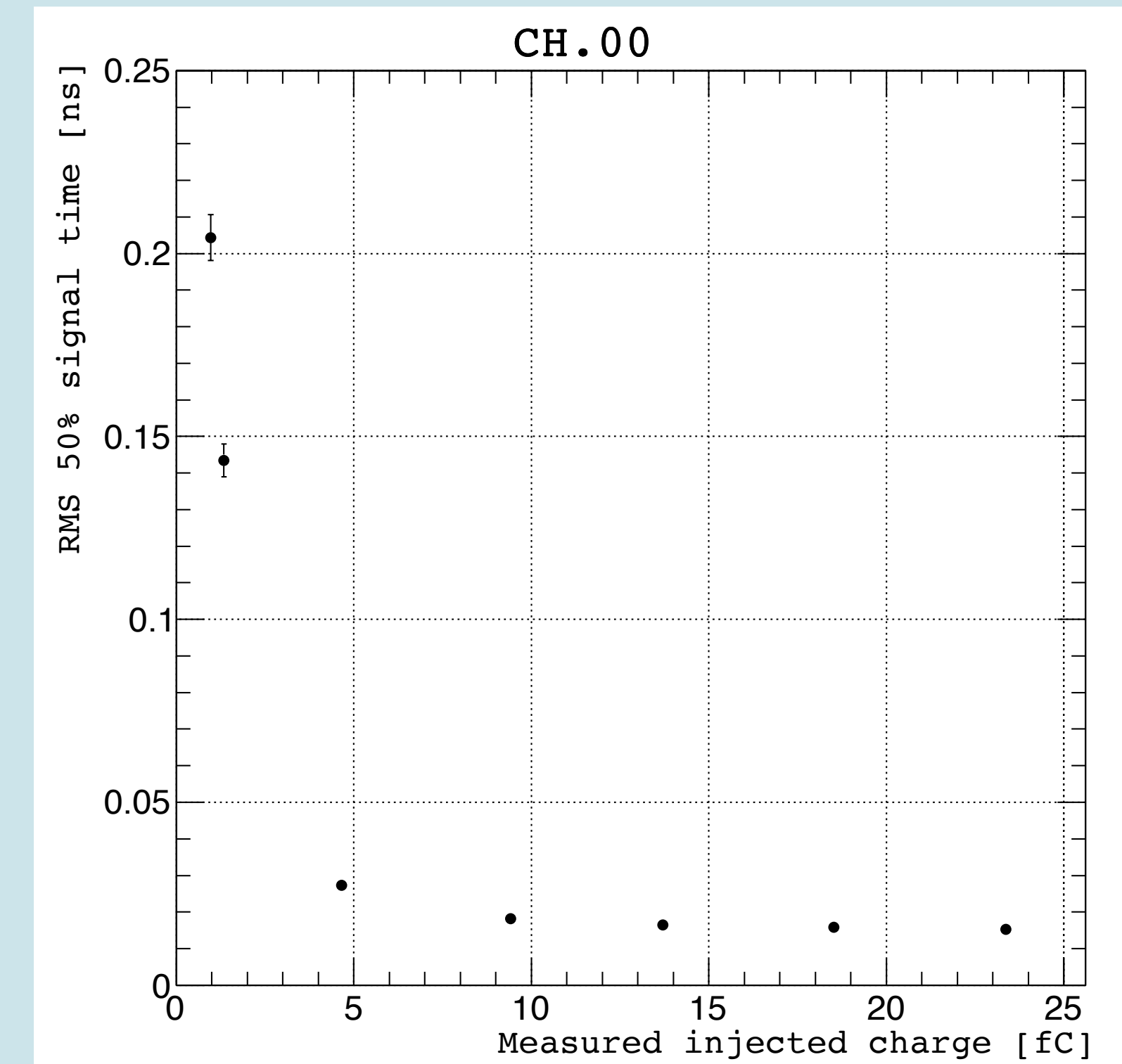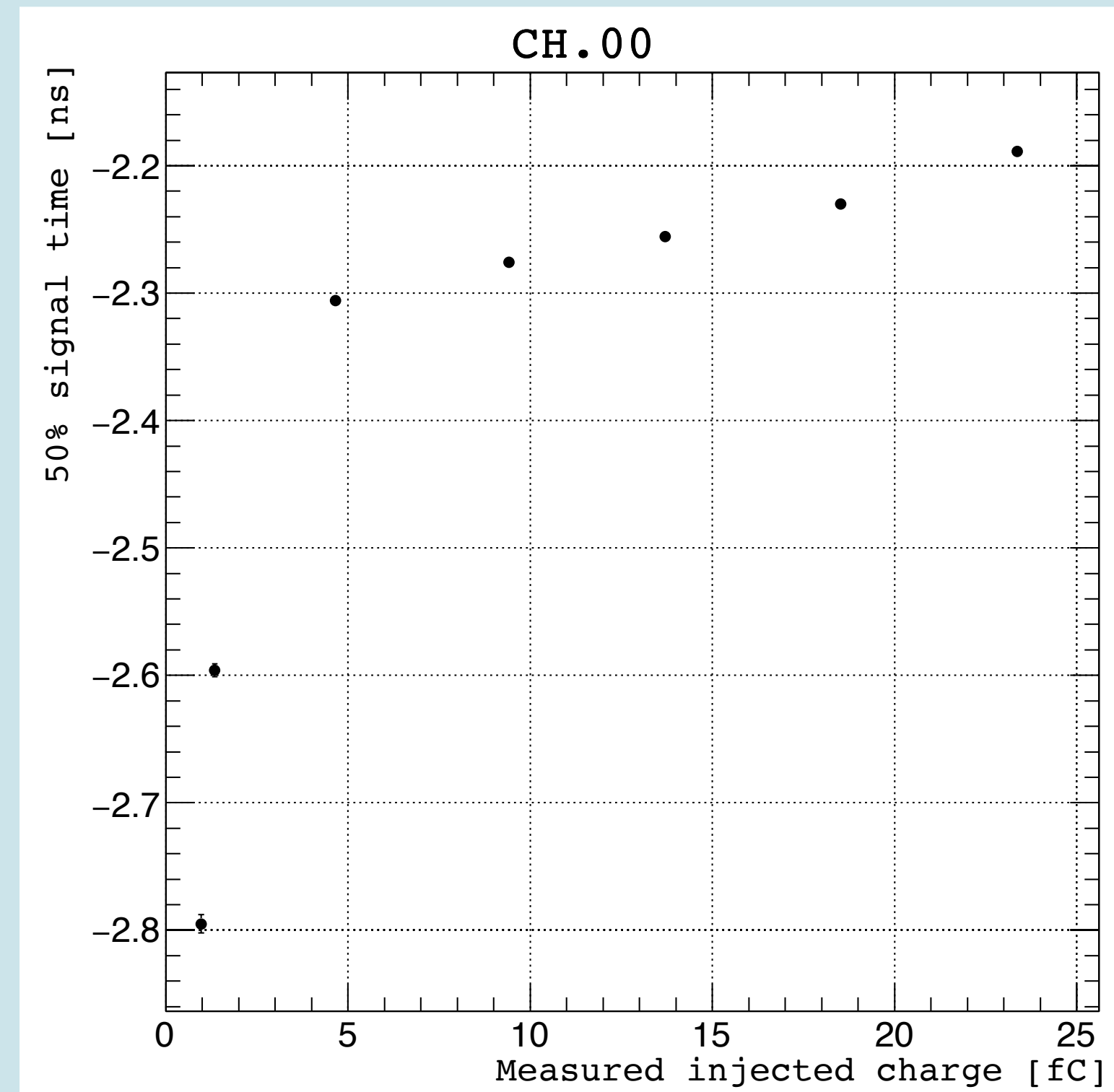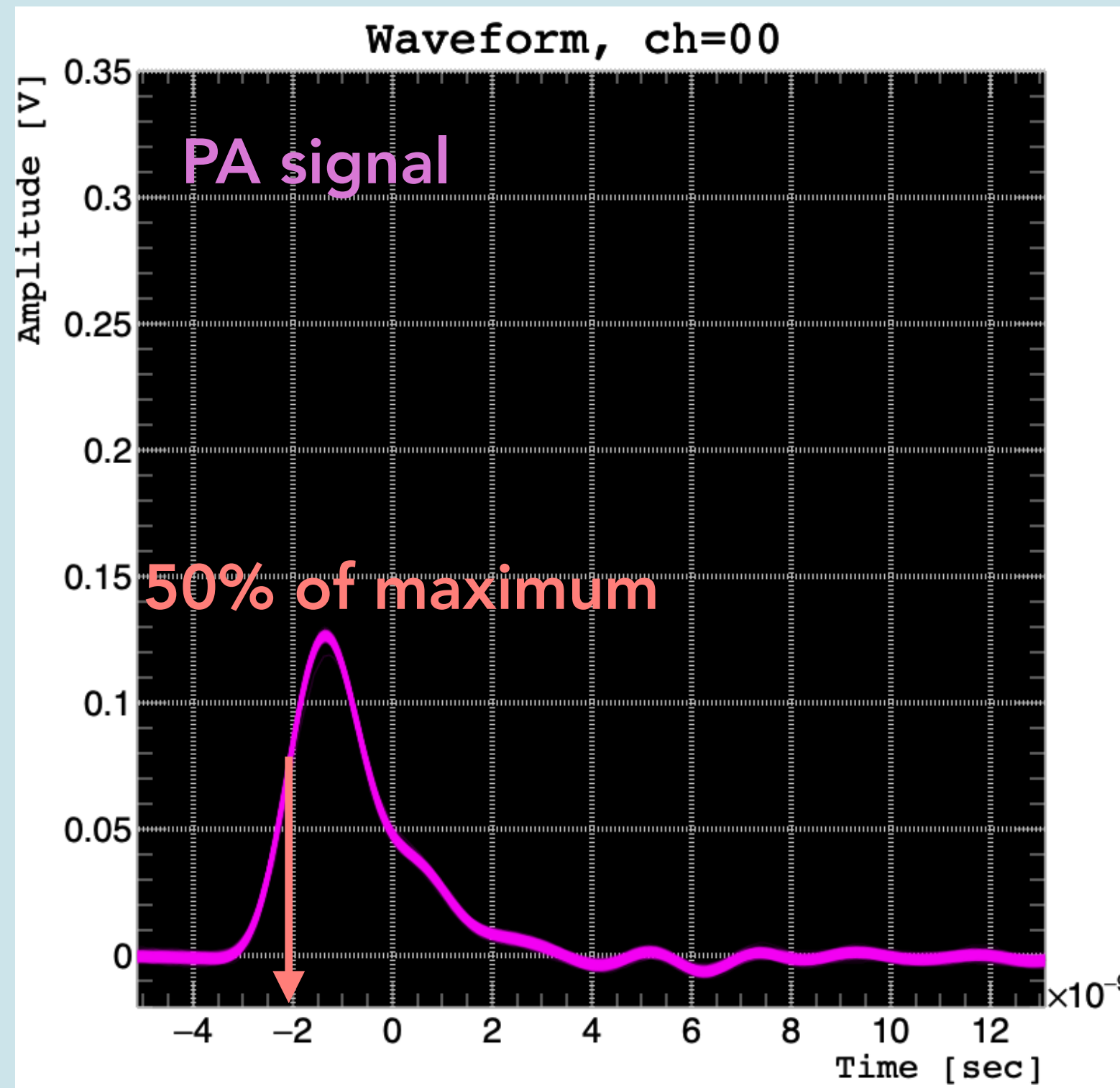
- Signal time of arrival increases rapidly for small charges and slowly for 5 fC and above
- The arrival time above 5 fC is stable and it is found to be σ~16ps (above 5 fC)

Timing resolution evaluation by CMD timing

- Time difference between CMD and PA signal increases at small amount of injected charges
- The RMS of maximum and 50% of the maximum are found to be σ~119 ps and 11 ps, respectively

Pixel (0,0)	Pixel (1,0)	Pixel (2,0)	Pixel (3,0)
Pixel (0,1)	Pixel (1,1)	Pixel (2,1)	Pixel (3,1)
Pixel (0,2)	Pixel (1,2)	Pixel (2,2)	Pixel (3,2)
Pixel (0,3)	Pixel (1,3)	Pixel (2,3)	Pixel (3,3)