

# TPC events in raptor

- One TPC event in raptor (rapobj::TPCReadout) contains one exposure (rapobj::CCDExposure) of each camera as well as the waveforms (rapobj::TPCWaveforms) recorded during the exposure time
- The TPCReadout objects are stored in the rapbase::Event class

# CCD exposures

- A `rapobj::CCDExposure` contains the ADU values (CCD channels) as well as the camera configuration (e.g. temperature, binning), saved in `rapobj::CCDConfiguration`
- In the `rapobj::CCDExposure` a CCDs ADU values are stored as 1D vector (`vector< rapobj::CCDChannelReadout>`). Each CCD channel corresponds to one pixel.
- Both, the bias frames and exposure frames, are stored in the `rapobj::TPCReadout` in their respective `vector<rapobj::CCDexposure>`. This implies currently that the storage space needed for the bias frames is multiplied by the number of exposures

# TPCWaveforms - the basics

- As the CCD images, the waveforms are organized on an event basis. For each event they are stored in a `rapobj::TPCWaveforms` object.  
[https://github.com/HPTPC/raptor/blob/deisting\\_chargeRO/src/obj/TPCWaveforms.hxx](https://github.com/HPTPC/raptor/blob/deisting_chargeRO/src/obj/TPCWaveforms.hxx)
- In the TPCWaveforms the actual waveforms recorded by the digitizer are stored in a vector of `rapobj::digitiserChannelData` objects — each vector entry holds all the waveforms recorded by one digitiser channel as well as the channel specific configuration  
[https://github.com/HPTPC/raptor/blob/deisting\\_chargeRO/src/obj/digitiserChannelData.hxx](https://github.com/HPTPC/raptor/blob/deisting_chargeRO/src/obj/digitiserChannelData.hxx)
- Each waveform is a `Double_t` vector (stored in a vector). There is one `vector<vector<Double_t>>` per digitiser channel

# digitiserChannelData

- In addition to the waveforms the rapobj::digitiserChannelData holds the channel specific digitiser configuration, e.g. vmin, vmax, channel ID ....
- The t0 (acquisition time) of each waveform is stored in a vector<TTimeStamp>
- Only the ADC values are stored for each waveform. The time values for an e.g. amplitude vs time plot needs is not separately stored but needs to be build from the sampling rate and record length.

# Digitiser board configuration

- The digitiser board configuration valid for all channels is part of the TPCWaveforms class, i.e. acquisition time, post trigger fraction, sampling rate
- The board configuration is set together with the waveforms in the `rapio::TPCReadoutFactory`  
[https://github.com/HPTPC/raptor/blob/deisting\\_chargeRO/src/io/TPCReadoutFactory.hxx](https://github.com/HPTPC/raptor/blob/deisting_chargeRO/src/io/TPCReadoutFactory.hxx)
- Where are some parameters (e.g. the dc offset, trigger threshold) which are not yet properly set and still need to be implemented. (In the HPTPC analysis we took these from the xml file, maybe these things are somewhere in a header?)