

# ProtoDUNE Xenon Doping

## PD analysis plans

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# Ongoing analysis and plans:

- **Standard situation - with “large” N<sub>2</sub> contamination (~5.7 ppm)**

Waveform analysis: fast and slow component decay time, single PE response, amplitude response to CRT events... to check any changing in PD system response over time (from last summer - after purity drop)

The most important point is to get a reference point for all the features planned to be analyzed during Xe doping.

- **Argon venting (from 21st to 28th of January 2020)**

Searching for any changing due to the Argon venting (increasing of the Argon Purity)

- **Xenon doping: Main Analysis**

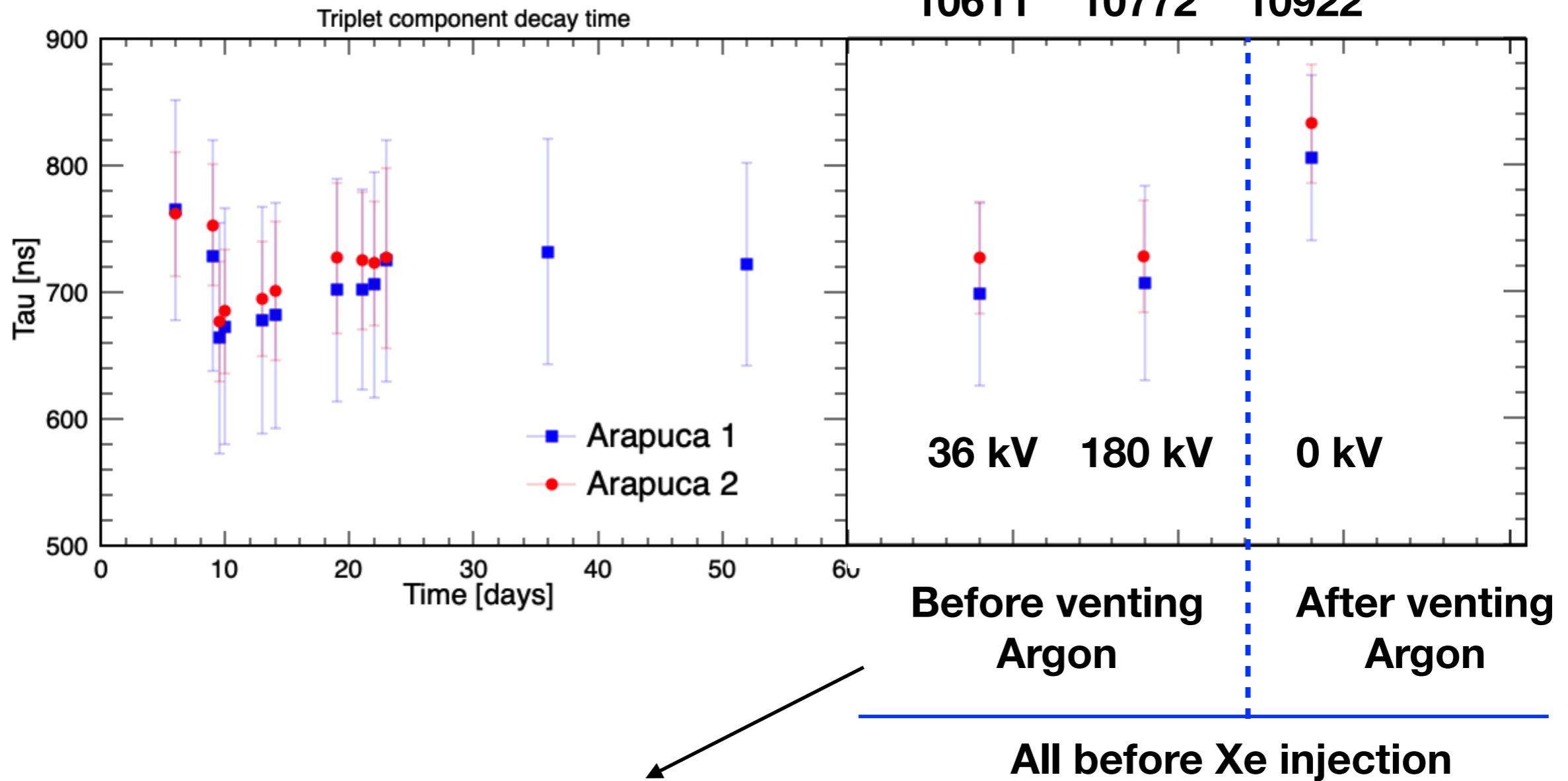
Xenon effects on the light production and waveform shape

# Very preliminary analysis

After first purity drop

Run number

10611 10772 10922



Run 10611: 09-12-2019  
Run 10772: 15-01-2020  
Run 10922: 10-02-2020

21-01-2020 start venting Argon

# Starting point:

- The slow component decay time resulted to be stable since the last runs before the Argon venting
- After the venting an increase of the decay time has been observed. It could be due to two factors which go in the same direction:
  - Increase of the Argon purity due to the venting
  - Electric field was off

More investigation is being bringing on to figure out that.

# Analysis plans:

- Slow component dependence from the electric field
- Waveform shape dependence from Xenon doping
- Light production dependence from Xenon doping
- Investigation on the electron life time degradation after Xe doping

**Any idea, comments and help are welcome**

# Updates on Argon contamination

**The gas in the Xenon bottle is still under investigation:**

- **The presence of oxygen seems to be confirmed but the percentage is still undetermined**
- **A Fluorine compound seems to be present in the bottle, it seems to be the  $C_2F_6$ , still not completely confirmed.**
- **Other analysis is going on.**