Possible TOF-Wall tests in the treatment room at CNAO

FOOT Physics Meeting 3/11/2021

Motivations

- The TW, up to now, has been investigated only at 2 energies at GSI (considering the center of the TW). It would be interesting to verify the detector response in a wider set of energies, for ions from C down to H.
- This could be a chance to:
  - Investigate the fragmentation cross sections (only Z) for different energies
  - Investigate the fragmentation cross sections (only Z) at large angles for low Z particles, varying the distance between target and TW.
  - Study the sensitivity of TW to protons, also adopting different gains in the two layers.

Proposed Measurements

- Fragment measurement with C-beam varying the energy of the primary particle in the range 115-400 MeV.
  - The set-up should be composed of SC and TW read-out in stand-alone configuration by the WaveDAQ, other detectors can be in the room at the same time, but complex configurations require time to be prepared.
- The preferred dates are 19-22 October: more than one consecutive night should be used for data taking to maximize the results

Set-up

- A target is needed to generate fragments, carbon targets (at least) should be used to obtain cross sections values.
- The primary beam will impinge at the center of the TW, no scans will be performed during the data taking.

  (no chance to move the TW in the treatment room)
- Distance between SC and TW can be adjusted if we want to investigate larger angles.
- TW will be mounted on wheels, so that the installation in the treatment room will be faster than the procedure at GSI
  - Once the height has been adjusted the first night, the other times the process should be very smooth.
  - Instrumentation could be (maybe) left mounted in the room during weekend, simplifying the procedure and maximizing the acquisition time.

Notes

- The TW detector will be left at CNAO after the data taking, while the DAQ will came back to Pisa (in case of needed fw/sw updates)
- The availability of SC is mandatory for the measurements
- more than one room can be equipped at the same time, sharing the beam time, if other groups are interested at the same slot.