DANTE: The new heavy ion detector for the CLARA-PRISMA setup.

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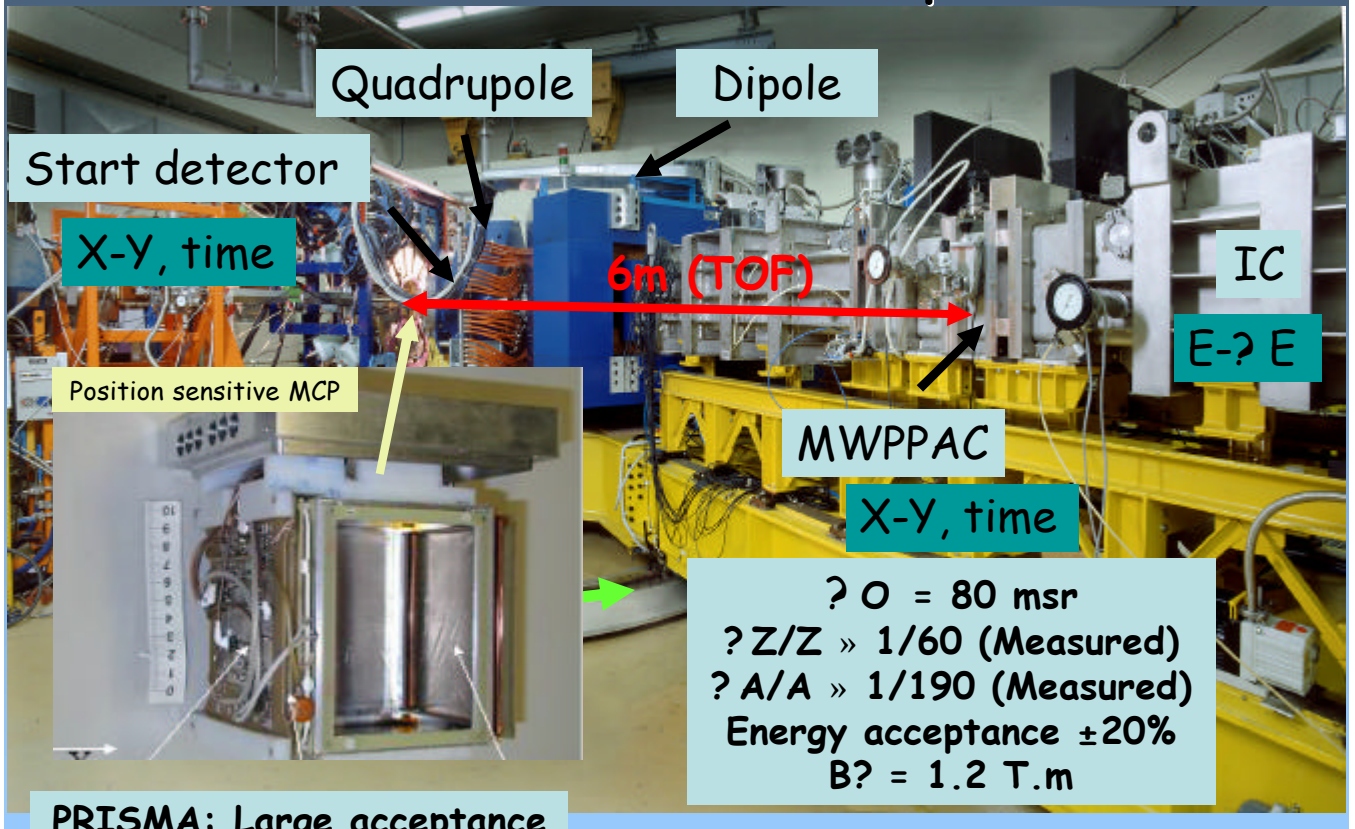
Overview

- The CLARA-PRISMA setup
- The heavy-ion detector DANTE
- On bench test of the DANTE detectors
- Some DANTE-like results
- Summary

CLARA-PRISMA setup

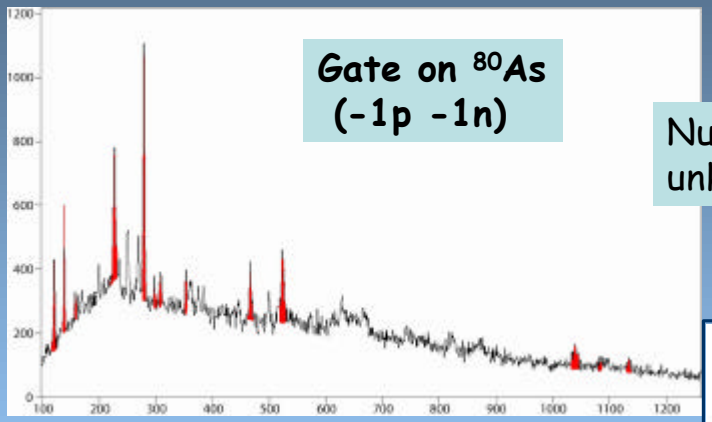


PRISMA: Large acceptance Magnetic Spectrometer

G.Montagnoli et al. LNL annual Report 165 (2000).

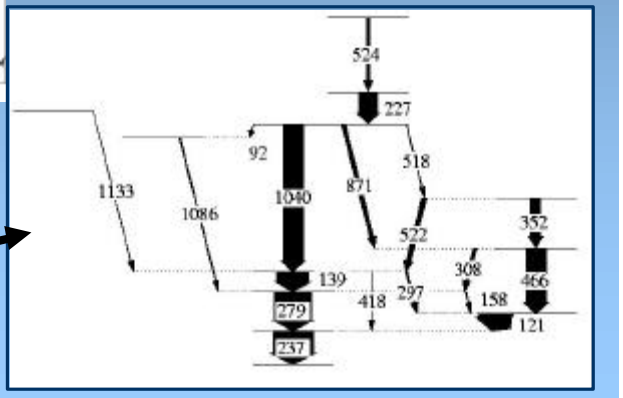
Some PRISMA-CLARA results

$^{82}Se+^{238}U$ @ 505 MeV ($T_{grazing}$=64°)



Nucleus completely unknown previously!

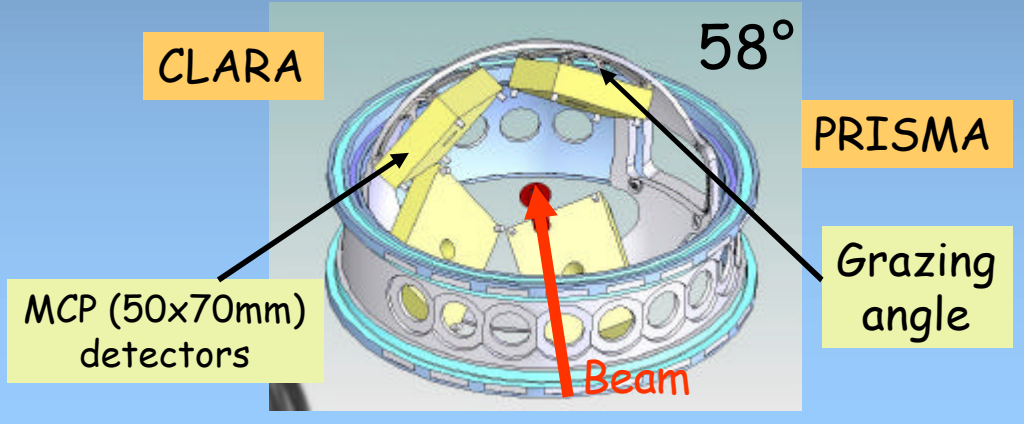
Level scheme from a thick target GASP exp.
^{82}Se + ^{192}Os @ 460 MeV



DANTE

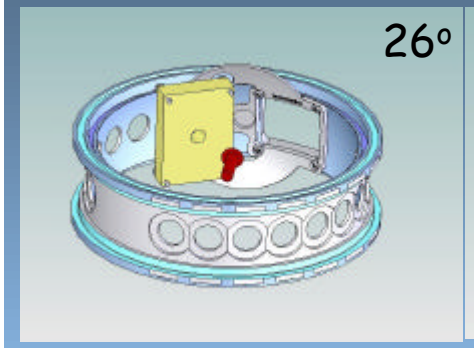
(Detector Array for multi Nucleon Transfer Ejectiles)

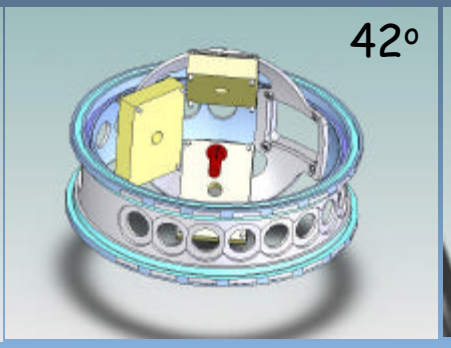
- Start detector of PRISMA ⇒ No possible to place PPACs
- Limited efficiency of the PRISMA-CLARA setup ⇒ No ?-? coincidences.
- DANTE (heavy ion detector based on MCP) reveals the position interaction of the recoils ⇒ Doppler correction.
- DANTE placed at the grazing angle, has a high efficiency ⇒ ?-? coincidences ⇒ No need of an extra GASP experiment to build up a level scheme.

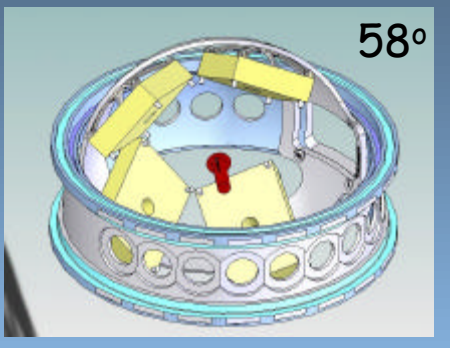


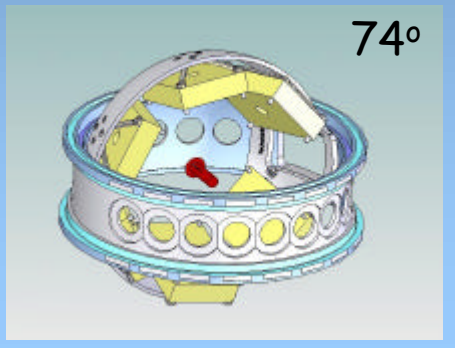
Versatility of DANTE

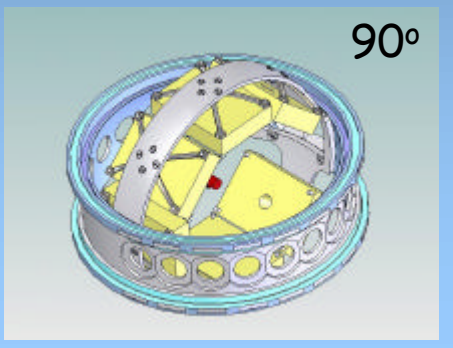
The DANTE configuration will depend on the grazing angle of the reaction of interest



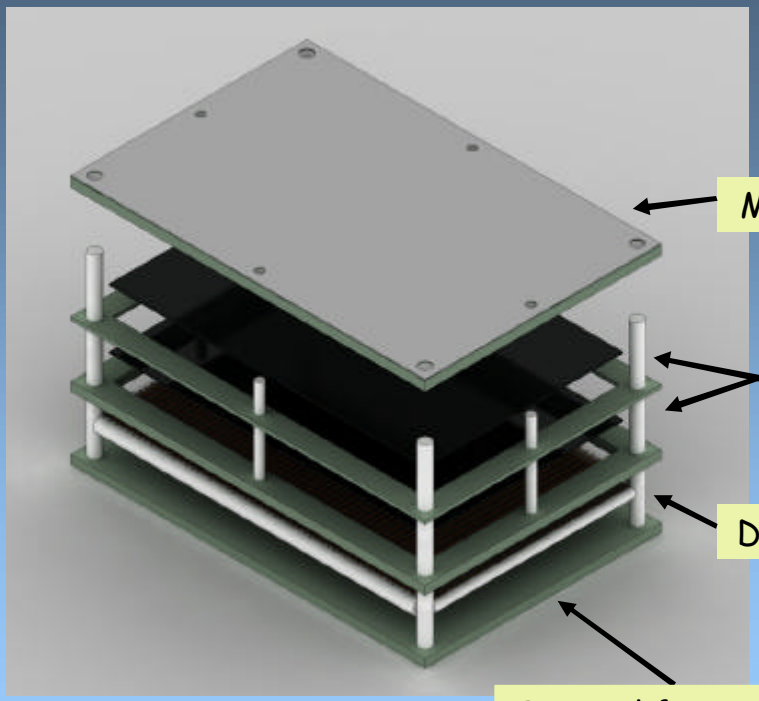




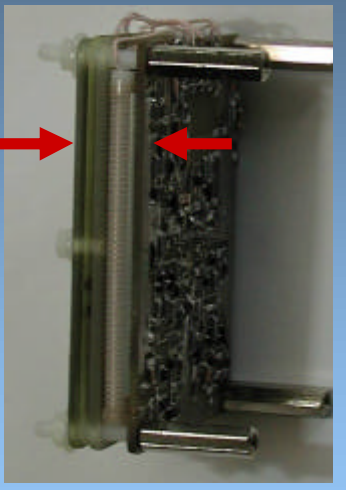




The DANTE detectors



Thickness:13mm

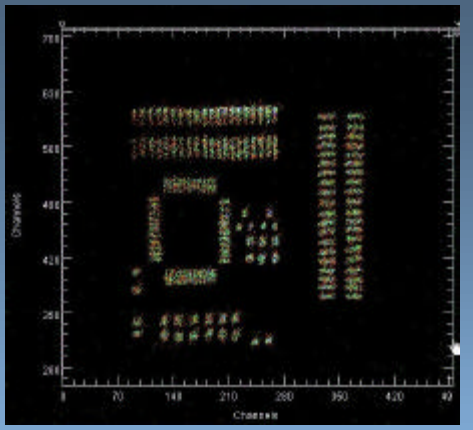


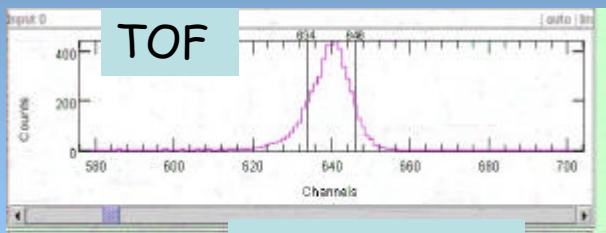
Lateral section

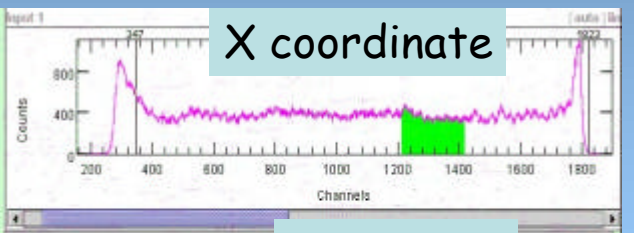
Test of the DANTE detectors

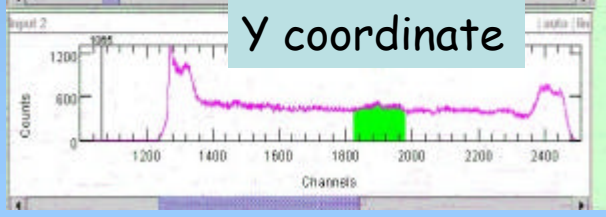
Test done with an a source

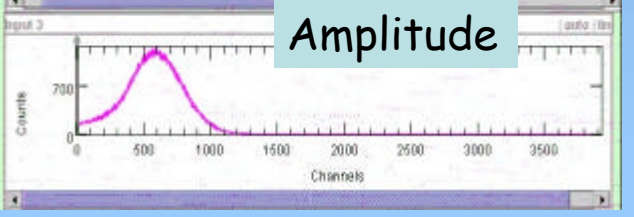
- Time resolution 130ps (TAC-ADC)
- Position resolution <1mm
- High counting rate
- High noise rejection



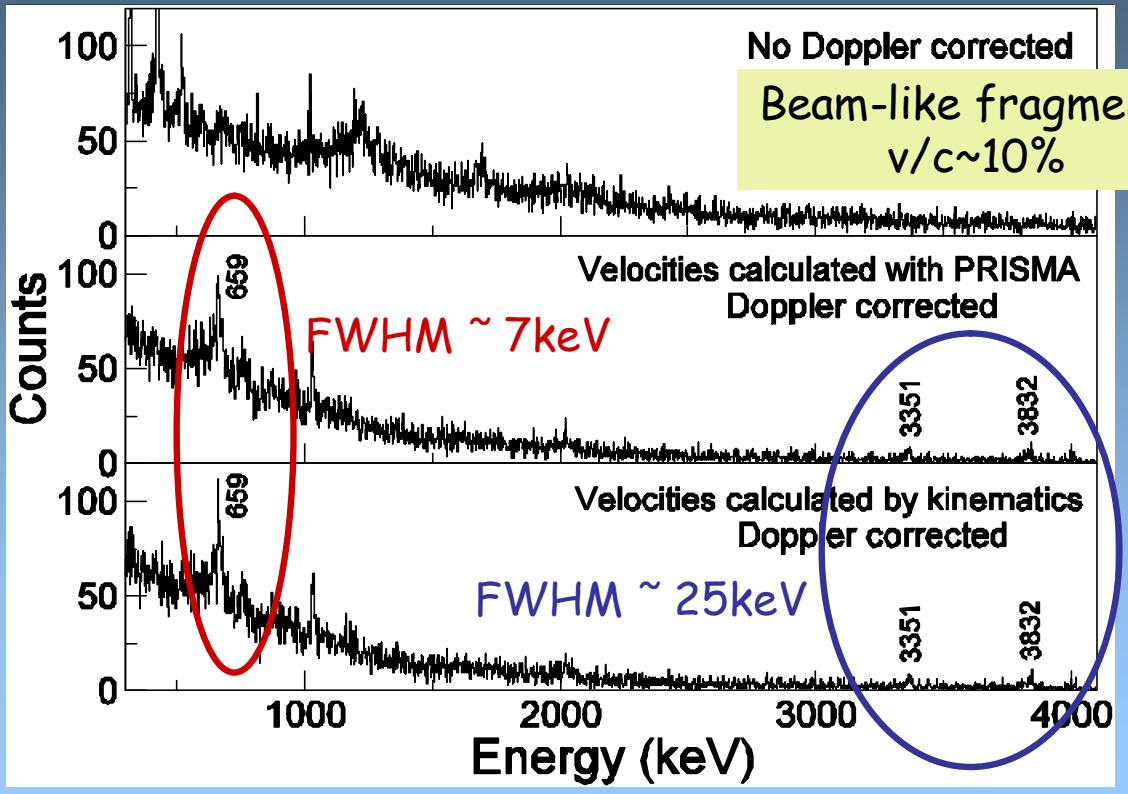






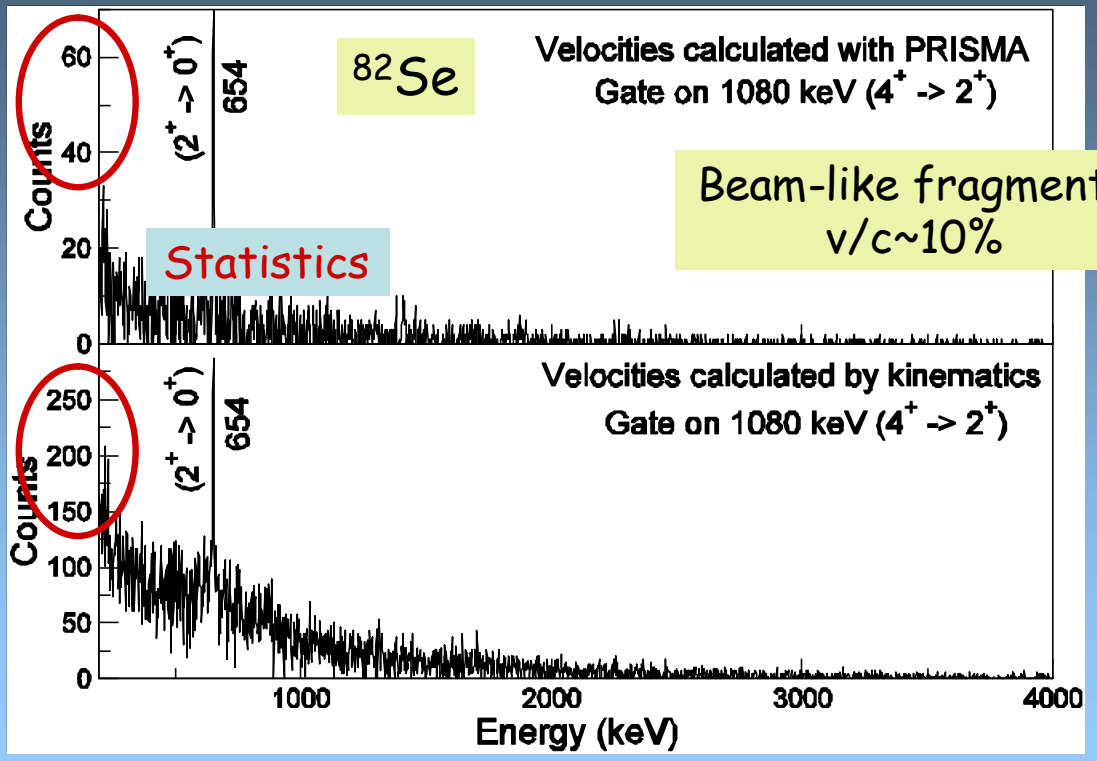


DANTE-like results: START detector PRISMA



Reaction: $^{48}Ca + ^{238}U$ @ 330 MeV

DANTE-like results: START detector PRISMA



Statistics

Beam-like fragments
v/c~10%

Reaction: ^{82}Se + ^{238}U @ 505 MeV

Summary and future work

- DANTE that will be placed at the grazing angle, will allow the Doppler correction of prompt ? rays
- The first DANTE detectors have been tested with an a source:
  - Space resolution, better than 1mm
  - Time resolution ~ 130ps
- DANTE-like analysis (START detector of PRISMA as a DANTE detector): Perform a good Doppler correction, increase the statistics
- On beam test of DANTE coupled to PRISMA-CLARA.

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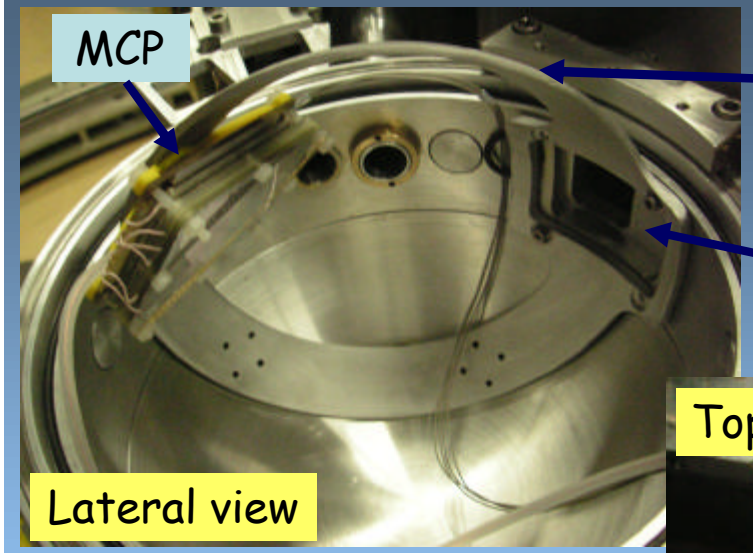
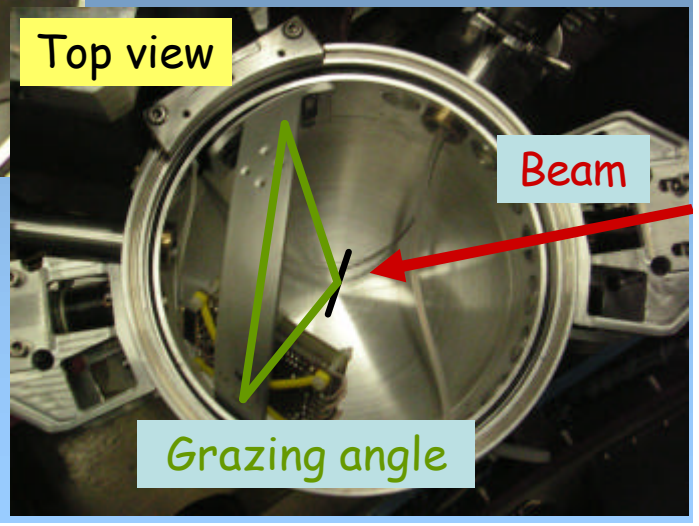
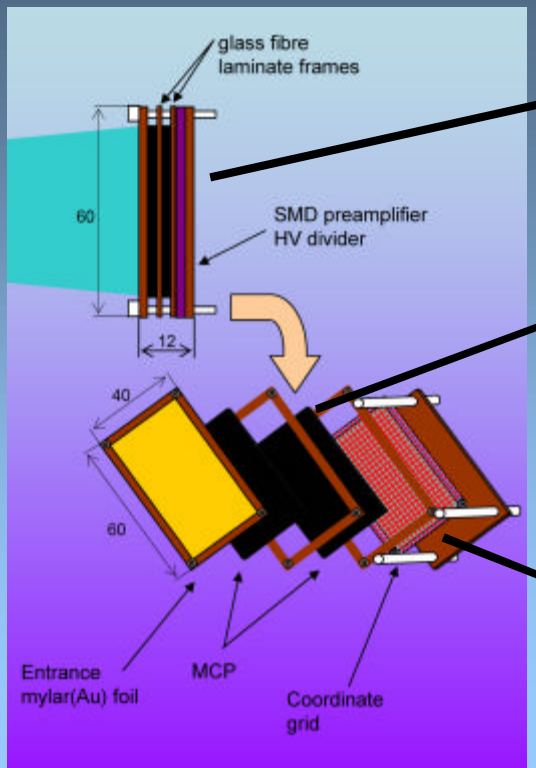
DANTE inside the reaction chamber





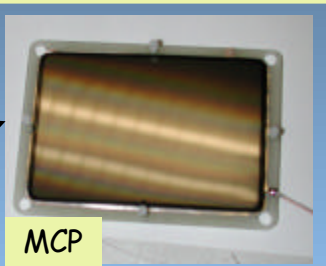
Reaction chamber of CLARA-PRISMA

The DANTE detectors

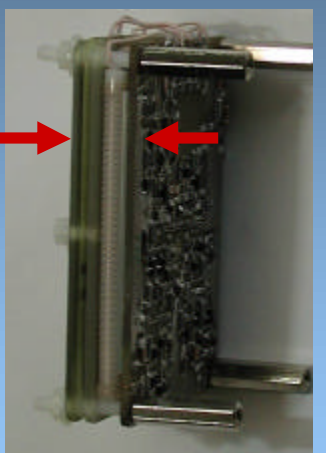


Preamplifier in vacuum

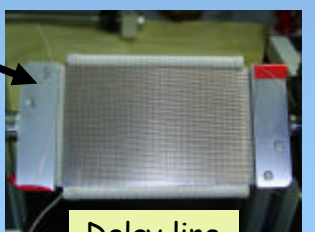
Thickness:13mm



MCP



Lateral section of the first DANTE prototype



Delay line