Weekly calibration meeting

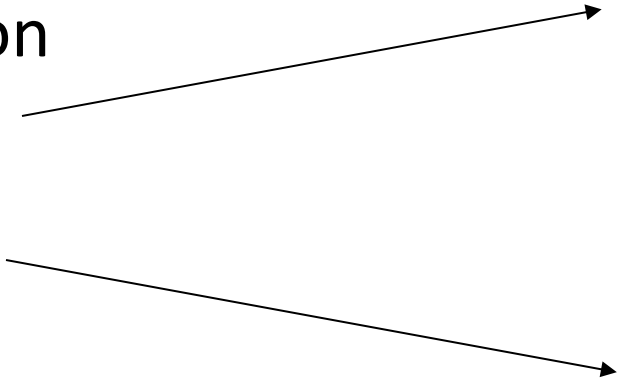
HMPID status report

24/11/2011

G. Volpe

ONLINE HMPID CALIBRATION

HMPID calibration and condition parameters



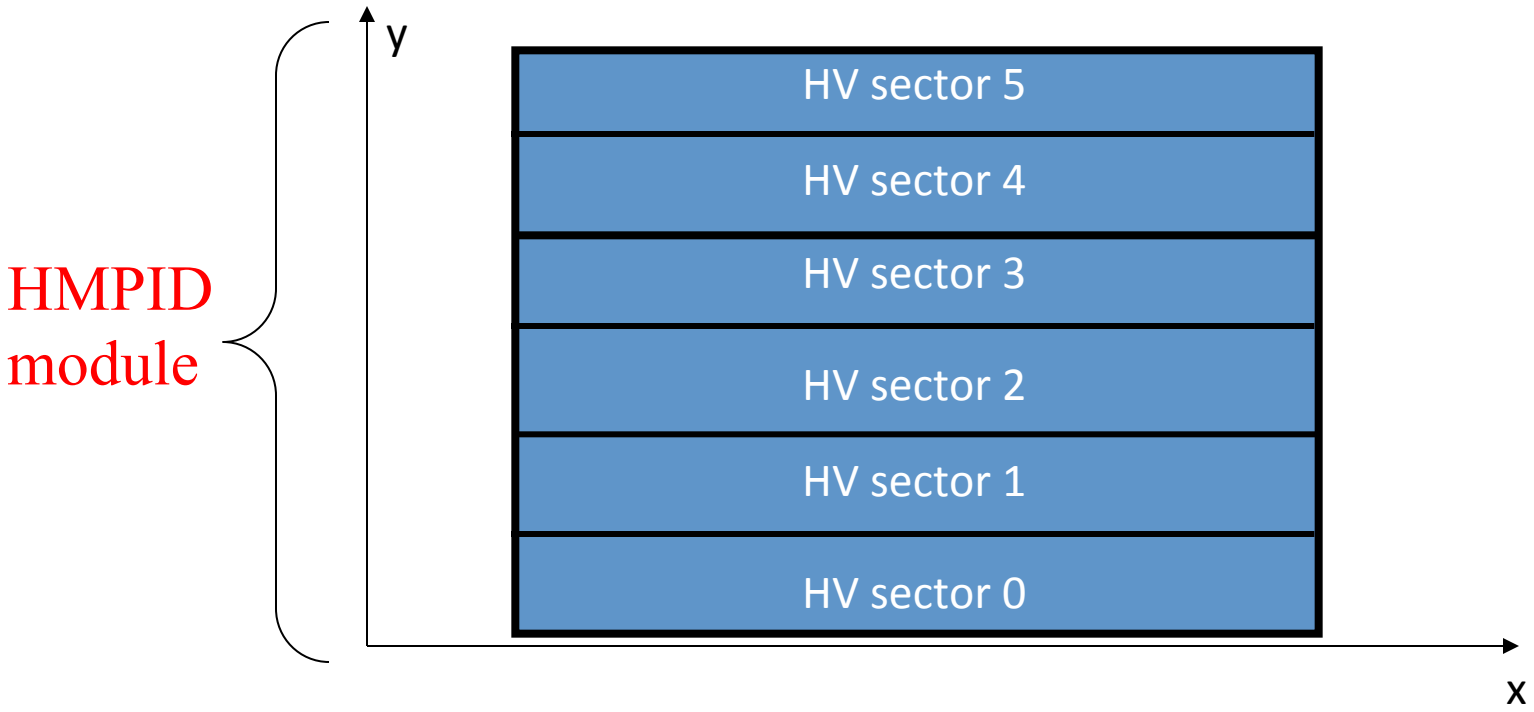
$Q_{threshold}$ (HV, P)

Freon (C_6F_{14}) refractive index

ONLINE HMPID CALIBRATION: chamber gain

$$Q_{thre} = f(V_{ch}, P_{ch})$$

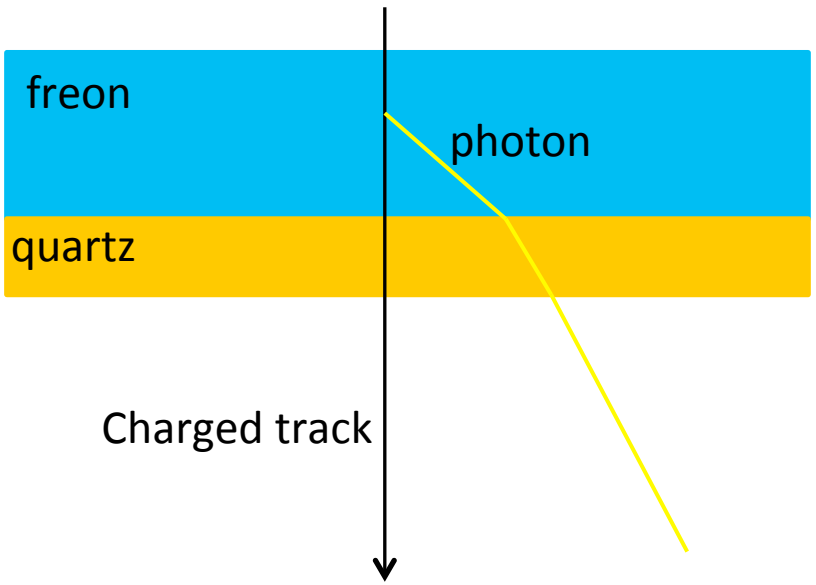
P_{ch} = pressure
V_{ch} = voltage



- From DCS by the SHUTTLE HV values (six per chamber) end pressure values are retrieved;

- In the preprocessor Qthre(time)(42 TF1 objects) are created and stored in the OCDB (Calib/Qthre).

ONLINE HMPID CALIBRATION: ref. index



Mean freon refractive index is needed to handle, during the emission angle reconstruction procedure, the refraction of the Cherenkov photons at the freon/quartz interface.

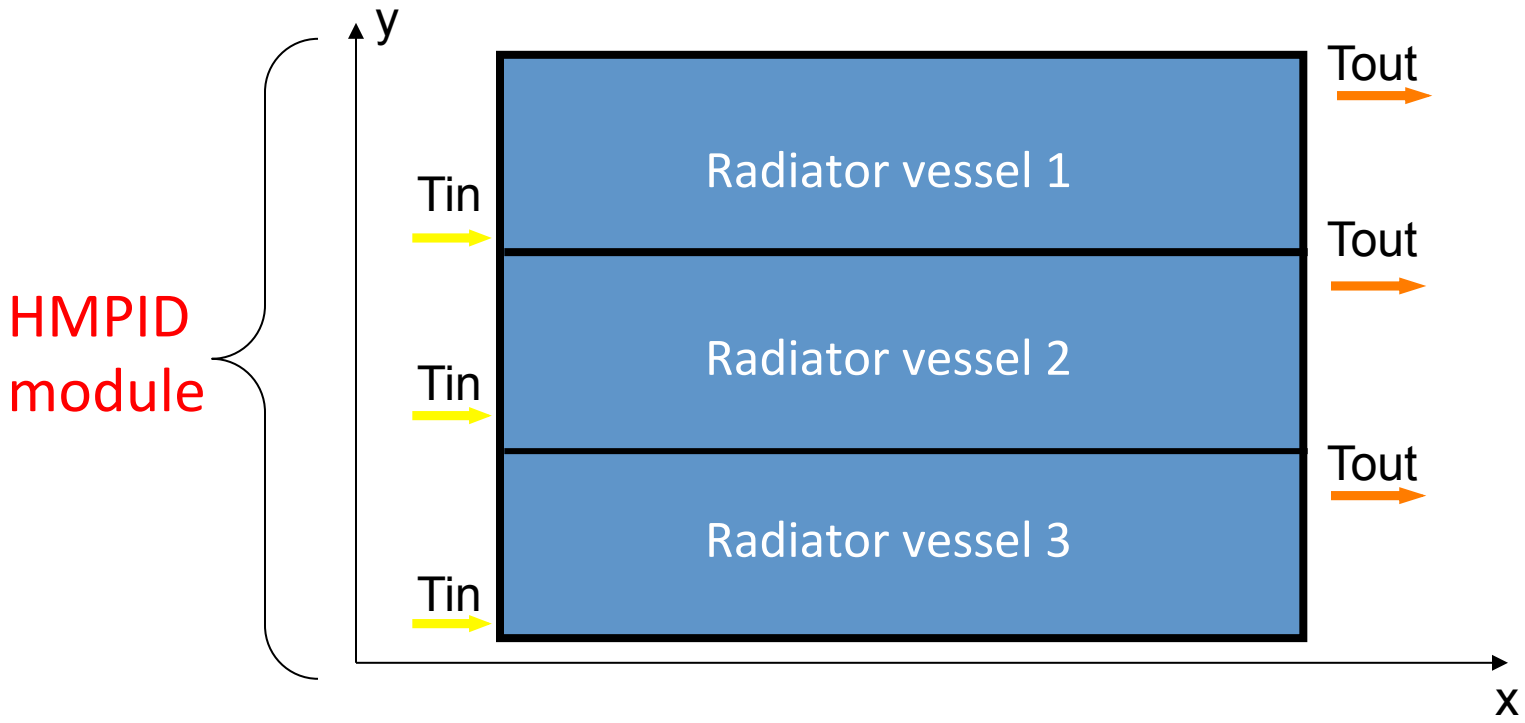
$$N_{freon} = f(Temp, E_{photon})$$

dn/dT ≈ - 0.0005/°C

dn/dE ≈ 0.02/eV

dθ/dn ≈ 1 mrad/0.001

ONLINE HMPID CALIBRATION: ref. index



- From DCS by the SHUTTLE Tin and Tout values are retrieved;
- In the preprocessor Tin(time) and Tout(time) (42 TF1 objects) are created and stored in the OCDB (Calib/Nmean);
- Assuming the temperature uniform long x direction and a linear gradient long y direction, radiator temperature for a given impact track point is calculated (AliHMPIDParam, AliHMPIDTracker).

ONLINE HMPID CALIBRATION: ref. index

Mean photon energy → It depends on materials transparency.

- Quartz transparency is hardcoded.
- Radiator (C_6F_{14}) transparency is calculated by the preprocessor ;
  - Preprocessor uses phototube current values taken from DCS by the SHUTTLE;
  - Photons E_{mean} (1 TF1 object) is calculated and stored in the OCDB (Calib/Nmean);

ONLINE HMPID CALIBRATION: pedestal evaluation

- A dedicated “detector algorithm” (HMPIDda) calculates the pedestal mean and sigma values for each channel over 1000 events from a dedicated runs (CALIBRATION RUN, zero suppression off).

- Mean and sigma values are uploaded to the electronics to perform the pedestal subtraction.

- Mean and sigma values are also stored in the OCDB, to allow to change the sigma cut offline, at reconstruction level.

OFFLINE HMPID CALIBRATION: alignment

- Alignment objects are created offline starting from local residuals of the unconstrained (ESD) tracks extrapolated to HMPID.

- Zero magnetic field data are preferably used.

- Alignment is rarely updated (1 time per year).

- Alignment status is regularly checked within the default HMPID QA. https://twiki.cern.ch/twiki/bin/viewauth/ALICE/QA

Conclusions

- Online and offline calibration for HMPID is rather robust, no problems so far.

- No changes are foreseen for the Pb-Pb data taking period and for the next year.