

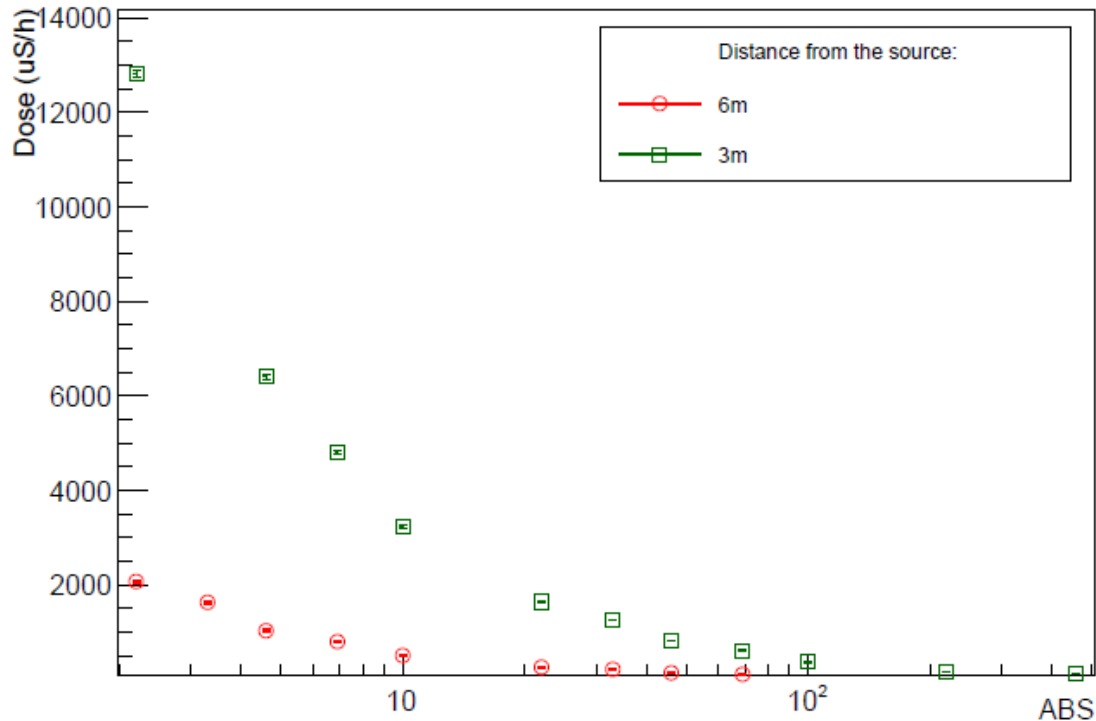
Status of the paper:

- Section 1- Introduction: almost final
- Section 2- Experimental set-up: almost final
 - > plot on the dose to be checked
- Section 3 – Experimental results (introductory part): almost final
- Section 3.1- Results without irradiation: almost final,
 - > plots on time resolution and cluster size to be added
- Section 3.2 – Results under irradiation: good shape
 - new structure proposed, including plots for comparing performance of the various chambers, originally thought for Section 3.3

Section 3.3 Overall gas mixture evaluation: propose to delete it and include relative plots in Section 3.2

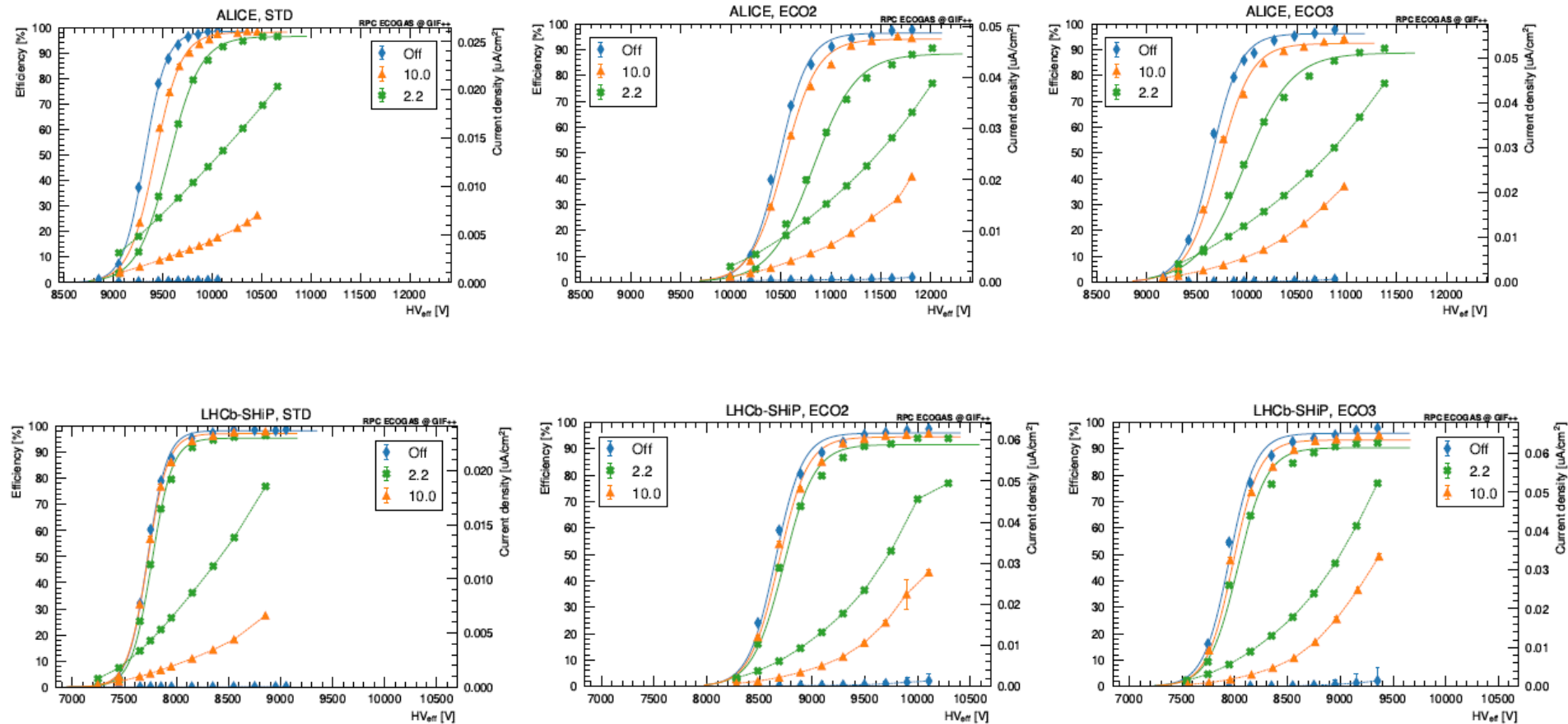
Section 4 Conclusions: to be written

Dose: issue about absorbed dose (measured in Gray) and equivalent dose (measured in Sievert). Equivalent dose measures the biological damage and should be used here.



Why use Sievert, which is the unit for Equivalent Dose? → check what has been measured, and change to Gray here and everywhere. → to check how the dosimeter was calibrated (for gammas, neutrons, or other particles, check on the datasheet)

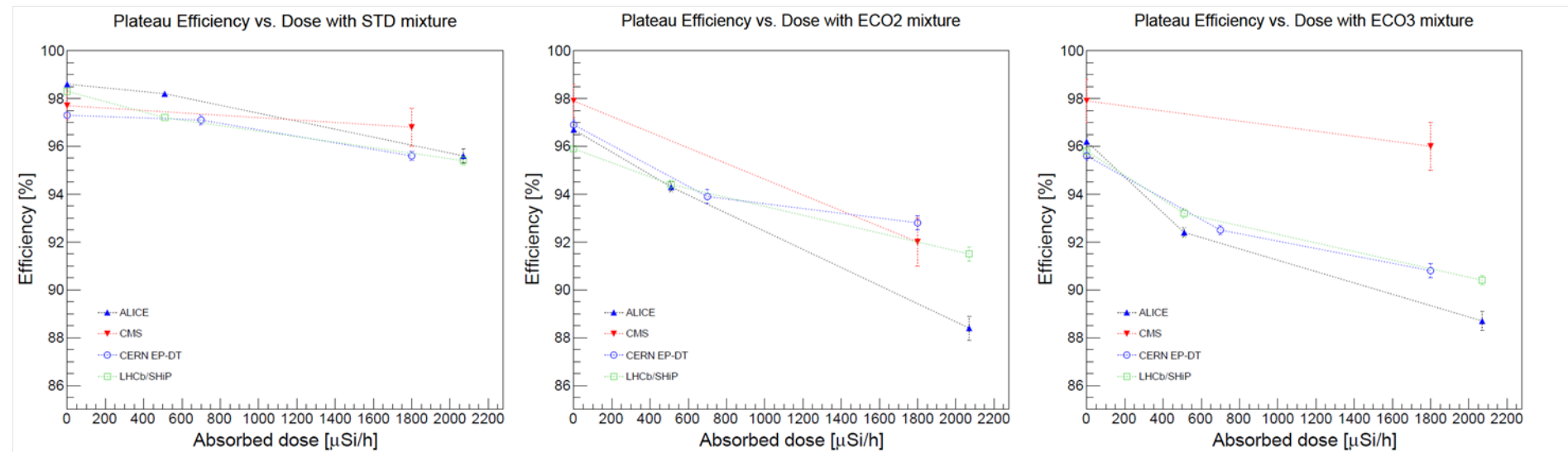
“New” layout of section Performance under irradiation



First, comparison of efficiency and current density at low and high rate, for the various gas mixtures. Two experiments shown, the other are “analogous”.

→ Postpone plots and considerations about the rate measured.

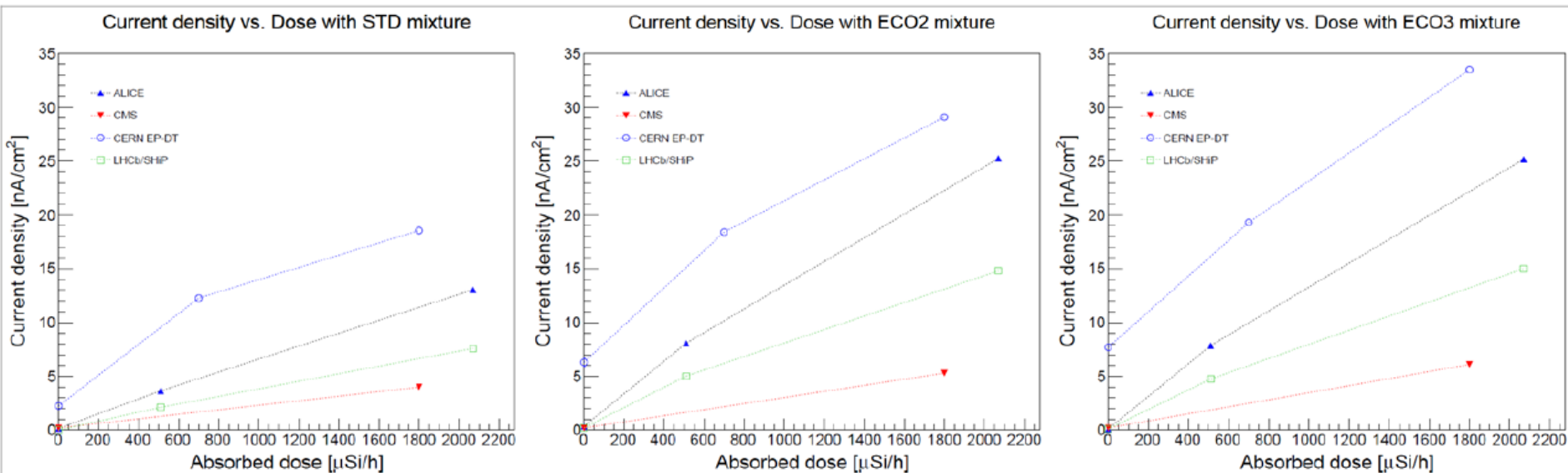
... then comments: first comment, plateau efficiency decreases at high rate



It decreases more for ECO2 and ECO3, because of the larger currents. → look at the currents

The plateau efficiency is NOT the maximum efficiency reached (efficiency still growing at the plateau)

- Maybe add a point for CMS? Maybe add points for other experiments?

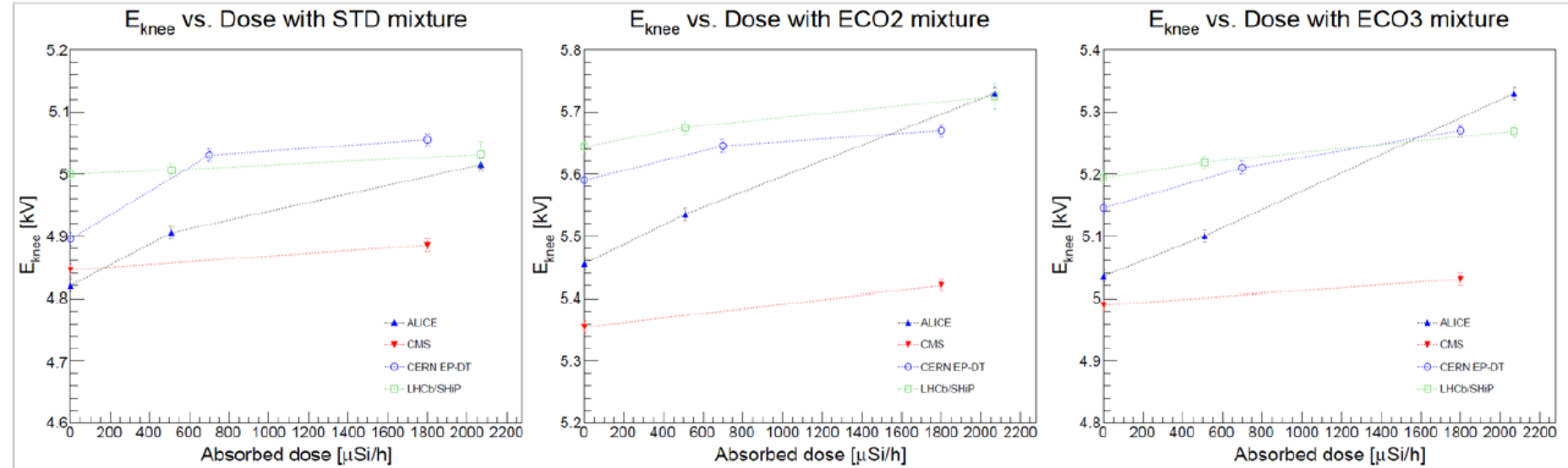


Current densities J_{knee} , measured at HV_{knee} . They are larger for ECO2 and ECO3 because of the wider charge distributions.

Possible solutions:

- add isobutane to the mixture (is there a good reference? Okay, it's an hydrocarbon and, like all other hydrocarbons, has well known quenching properties)
- Add SF6 (not possible because of its high GWP and shift in the WP)
- Aging effects important point to investigate → main goal for RPC@GIF++ and AidaInnova task 7.2

Anyhow, larger currents are at the base of the shift in the operating voltage; we have to compensate increasing the applied voltage



The shift is larger for ALICE, while current densities are larger for CERN EP-DT. Why?

→ The other ingredient is resistivity

Note that the shift is not SO larger for ECO2 and ECO3 with respect to STD (except for ALICE).

Do we understand the shift? Compute HV_{gas} and plot efficiency curves vs $HV_{gas} \rightarrow$
 Maybe Luca for ALICE? Ask to CERN EP-DT to check it?

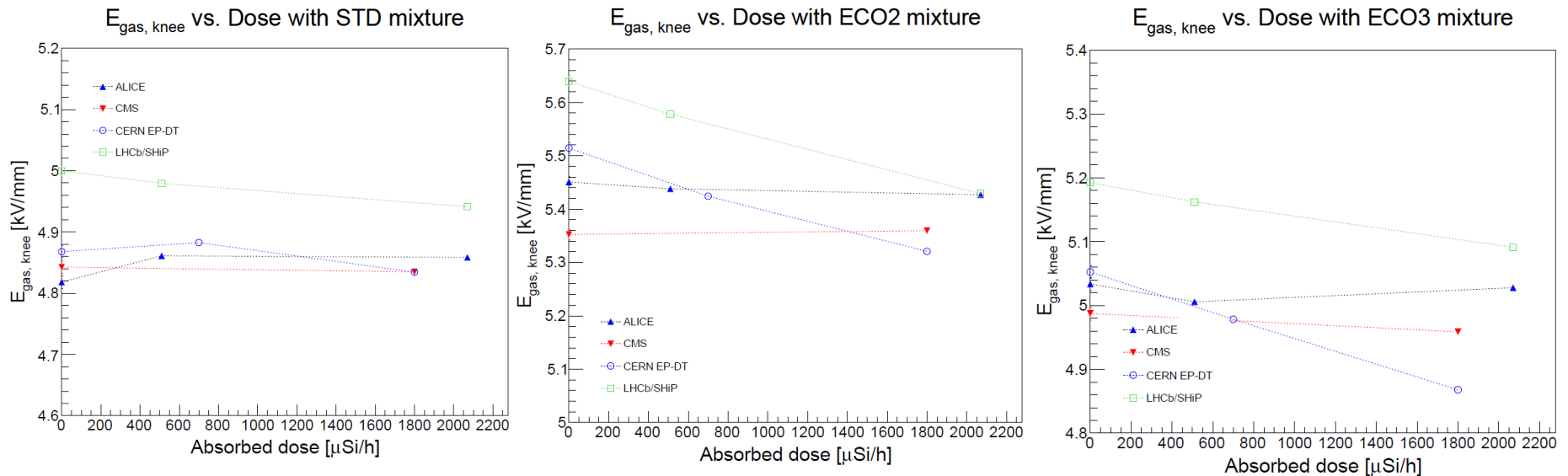
\rightarrow Insert plot(s)

$$HV_{gas} = HV_{app} - \rho d J$$

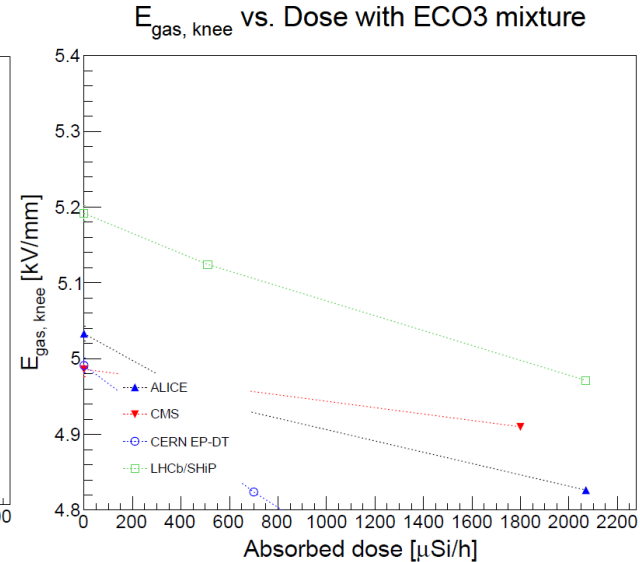
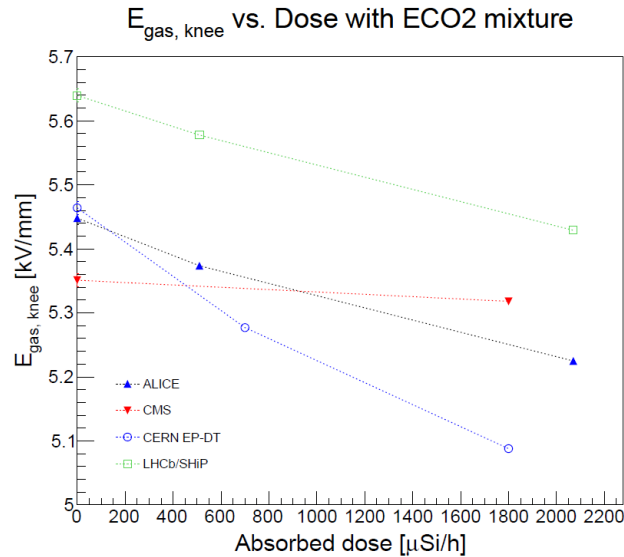
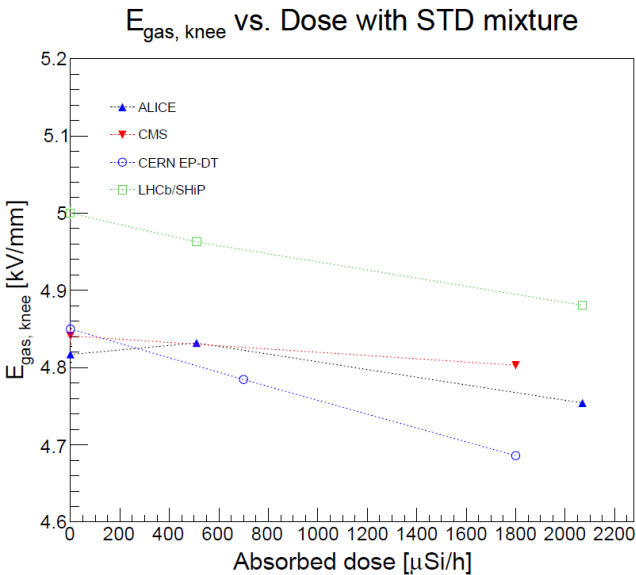
- ρ resistivity

- total electrode thickness

- J current density



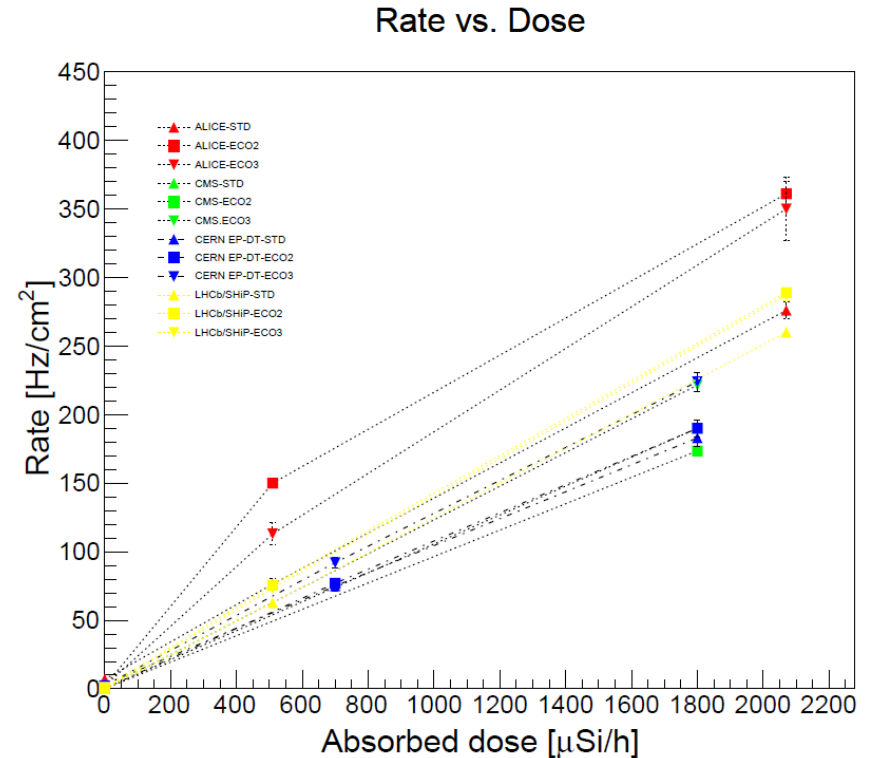
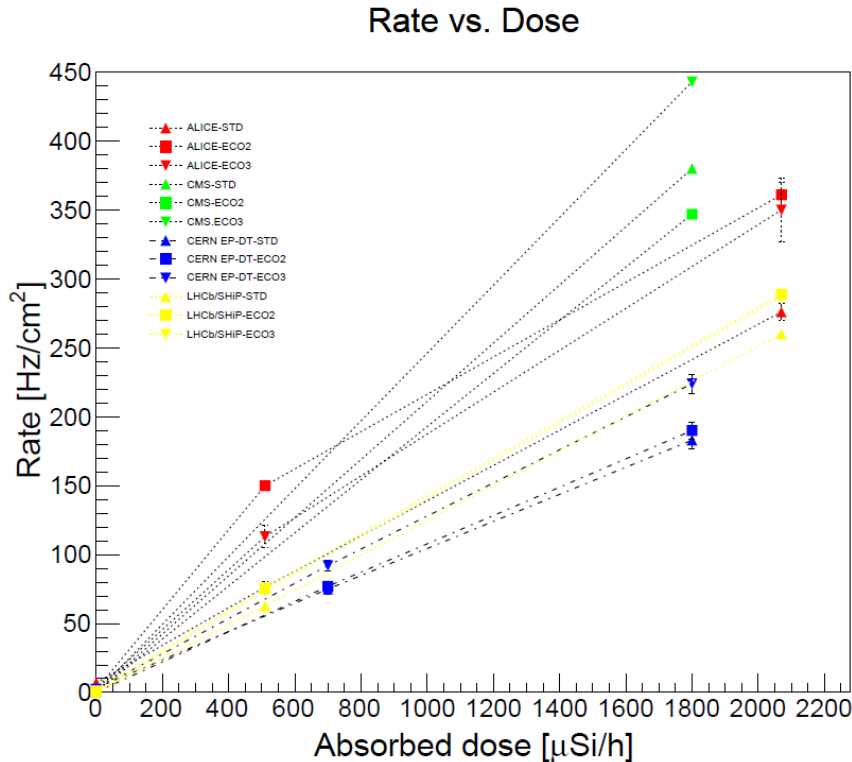
$$\rho \text{ resistivity} = 0.6 \times 10^{11} \Omega cm$$



ρ resistivity = $10^{11} \Omega\text{cm}$

These plots change significantly with the resistivity value used \rightarrow need an independent measurement \rightarrow how much significant the check that we do?
 $E_{\text{gas, knee}}$ MUST be different in the various cases, because efficiency measured is different, at the knee \rightarrow we are not making comparison at fixed efficiency, so no need to have same value of $E_{\text{gas, knee}}$

We HAVE to make a correlation between Dose and measure rate



But which one?

→ Check how the rate for CMS was computed (double gap, twice the value?)

Disclaimer: rates should be corrected by efficiency, but the correction should NOT be so large, because efficiency for Compton electrons should be larger than efficiency to MIPs.

Pending issue: add plots about

- Cluster size at the knee (no irradiation and irradiation, STD ECO2 and ECO3) → check that cluster size is computed in the SAME way in all cases;
- time resolution at the knee (no irradiation and irradiation, STD, ECO2 and ECO3) → check that time resolution is computed in the SAME way in all cases.

Maybe add a time distribution? Add cluster size vs. HV in few cases?