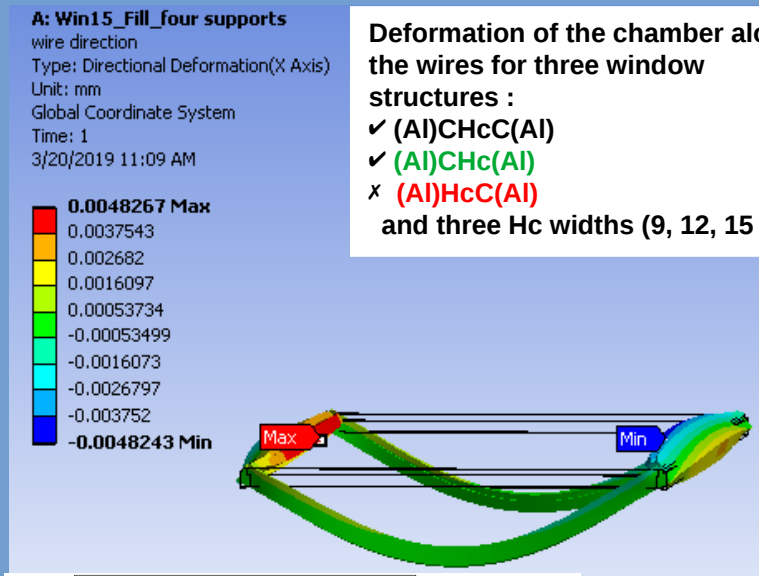
Transition Radiation Simulations
Entrance Window Selection

Bucharest-TRD group

www.ifin.ro

TRD working Meeting
14th October 2020
Remote-Online

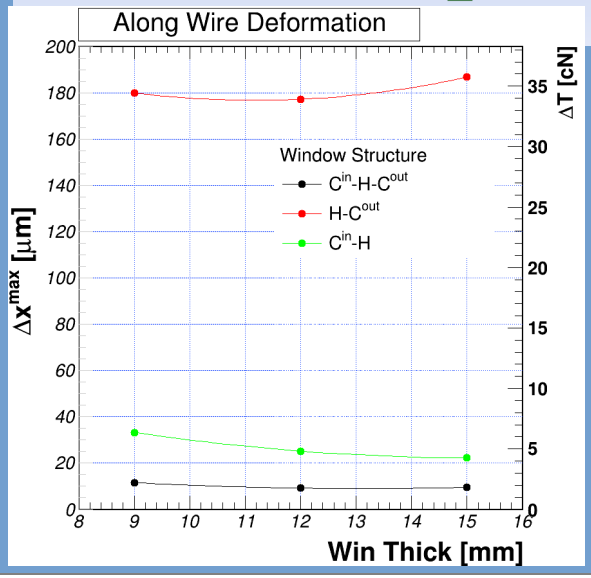
Entrance Window
… from the mechanical perspective



Deformation of the chamber along the wires for three window structures :

- ✔ (Al)CHcC(Al)
- ✔ (Al)CHc(Al)
- ✗ (Al)HcC(Al)

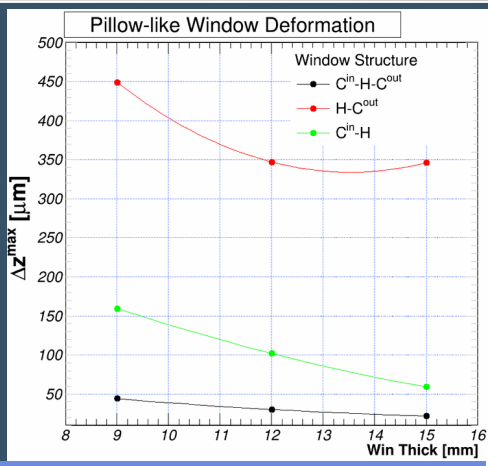
and three Hc widths (9, 12, 15 mm)

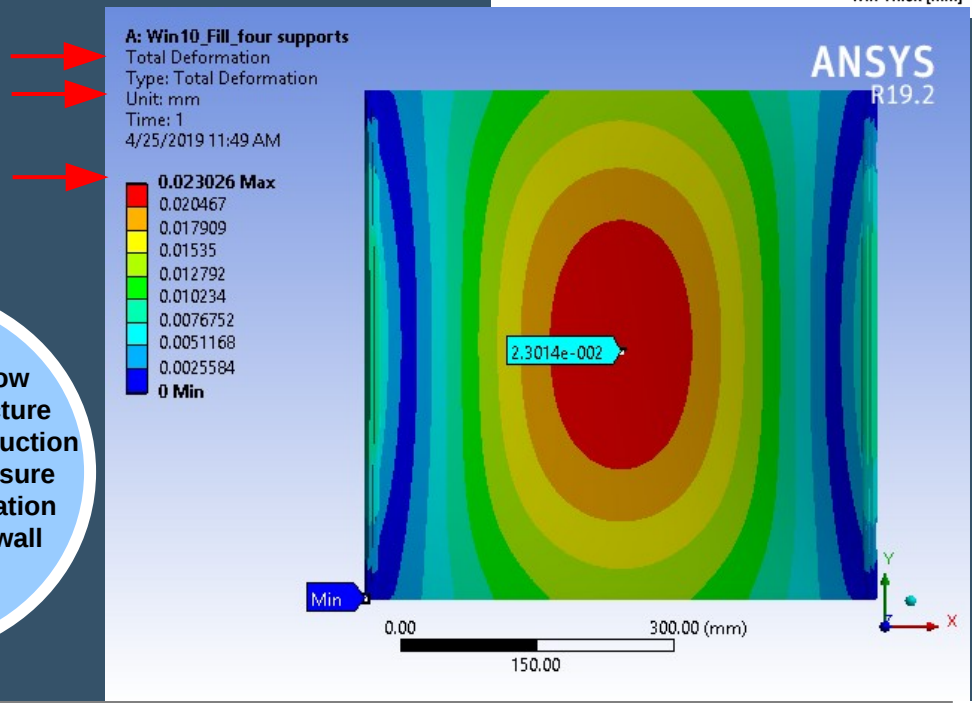


The entrance window is used as core structure during chamber construction and afterwards to assure limits on the deformation and support in the wall

Deformation of the entrance window due to cathode wire tension (100cN/wire) for three window structures :

- ✔ (Al)CHcC(Al)
- ✔ (Al)CHc(Al)
- ✗ (Al)HcC(Al)





Transition Radiation (check)

TDR pg. 80

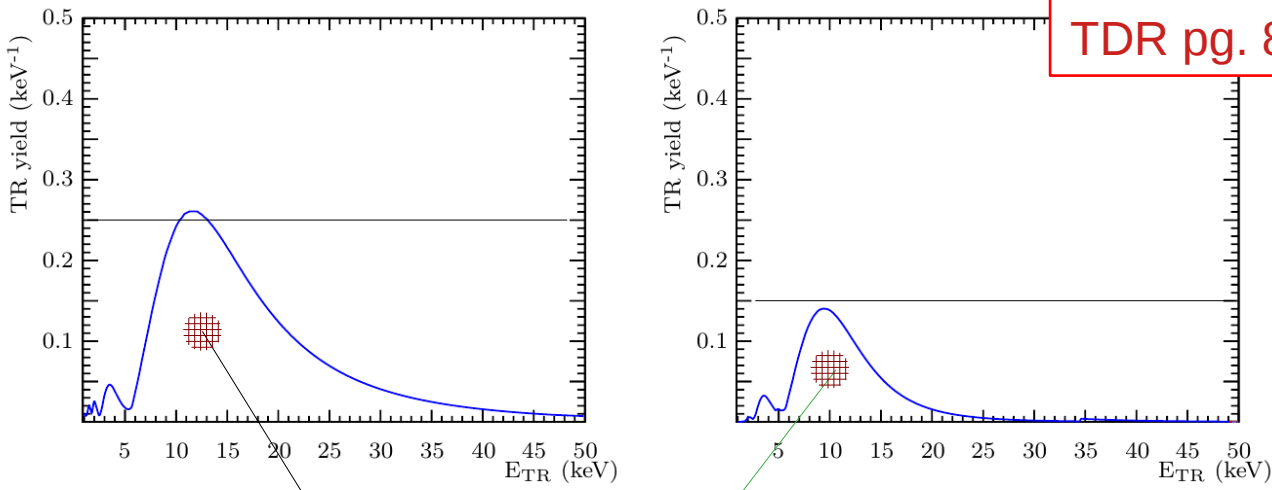
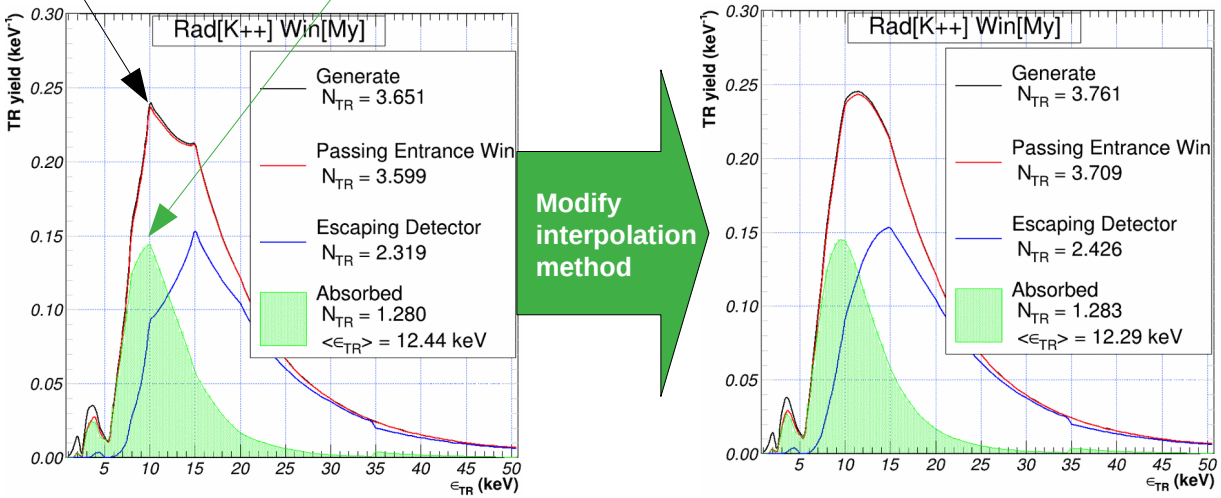


Figure 6.3: TR-photon emission (left) and absorption spectrum (right) for electrons at a momentum of 2.0 GeV/c for a POKALON N470 radiator with 24 µm foil thickness and 700 µm foil spacing, composed of 350 foils.

There is still a difference between the generated TR spectrum in TDR and that from CbmRoot. The cause may lie in different Interpolation/data-set used by Cyrano

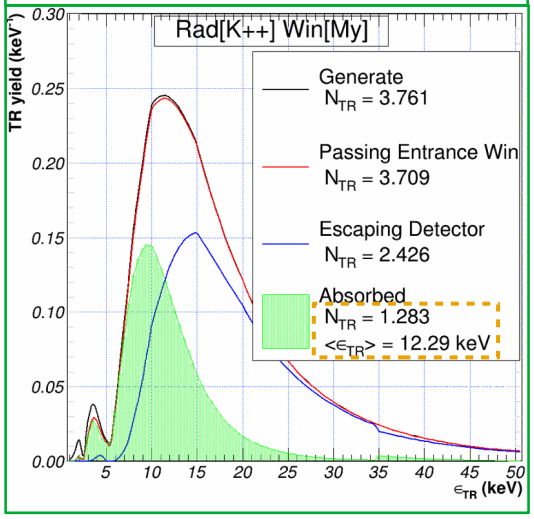
Current simulations using *CbmTrdRadiator*
Using the same settings as described in the TDR (see Fig. 6.3/pg.80)

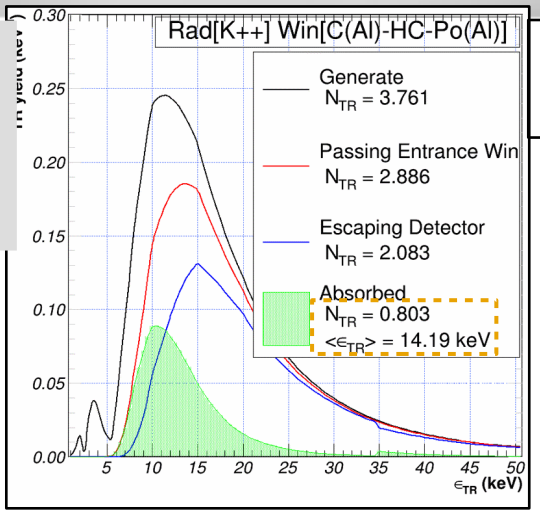


Transition Radiation (entrance window)

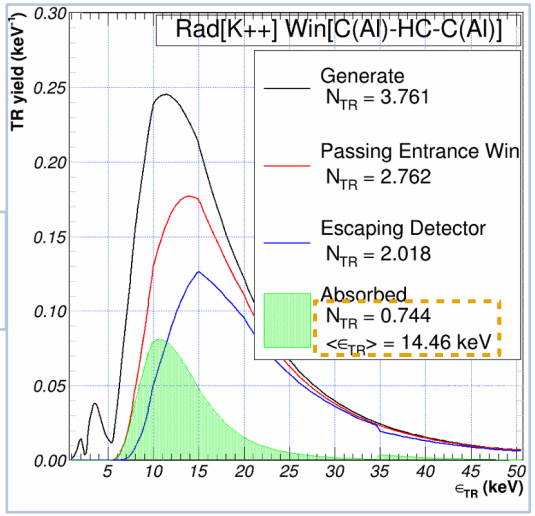
Bucharest
Entrance window components
Al – 12 μm
C - 200 μm
Honeycomb [HC] – 9 mm
Polyethylene [Po] - 25 μm

TRD Muenster Mylar Entrance Window

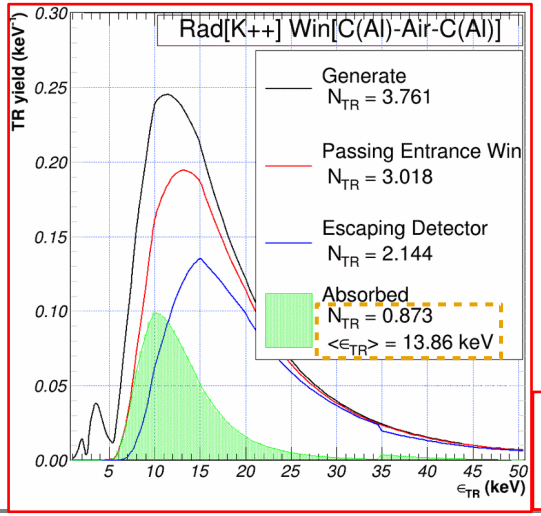




TRD Bucharest sandwich
Lightest Entrance Window
Carbon-Honeycomb-Polyethylene



TRD Bucharest sandwich
Default Entrance Window
Carbon-Honeycomb-Carbon



TRD Bucharest sandwich
Estimate Entrance Window
Carbon-Air-Carbon

- All yields are reported for E_{TR} in 1-50 keV
- The Buch windows **cuts small energy** TRs
- The **limitation** of yields reported here do not include **FEE dynamic range** saturation
-The real limitation is increased by the **electron dE/dx shift**.

ToDo

1. Construction of two entrance windows with structure (Al)CHcC(Al) and (Al)CHcPo(Al) respectively.

2. Test absorption at 6 keV (55Fe)

Online current status of this topic can be followed @
https://git.cbm.gsi.de/bucharest/addendum-2d/-/issues/2