

`source_pads_internal_bulk`

- Corresponds to the **selenium foil pads** (just the actual selenium part, not the mylar coating)
- Use this to simulate $0\nu\beta\beta$ and $2\nu\beta\beta$ decays from the Se foils (`Se82.0nubb` and `Se82.2nubb`)
- Use this to model any contamination of the foils (^{214}Bi and ^{208}Tl : `Bi214_Po214` and `Tl208` are the main $0\nu\beta\beta$ backgrounds; there are several other lower-energy backgrounds that affect $2\nu\beta\beta$).
- Note the copper foils at the outer edges of the detector are not included in this vertex generator. To model any contamination of the copper foils, you would use `source_pads_external_bulk`

Top view

Zoomed view

Copper foil
not included

Selenium
foil included

source_pads_surface

- Radon decaying in the tracker may deposit radioisotopes on the surface of the foils (particularly ^{214}Bi Bi_{214} Po_{214})
- As this comes from the tracker rather than from inside the foils themselves, it will be deposited on **both the copper and the selenium** foils
- This is an important background as particles from surface decays are less likely to be absorbed than particles from inside the foil

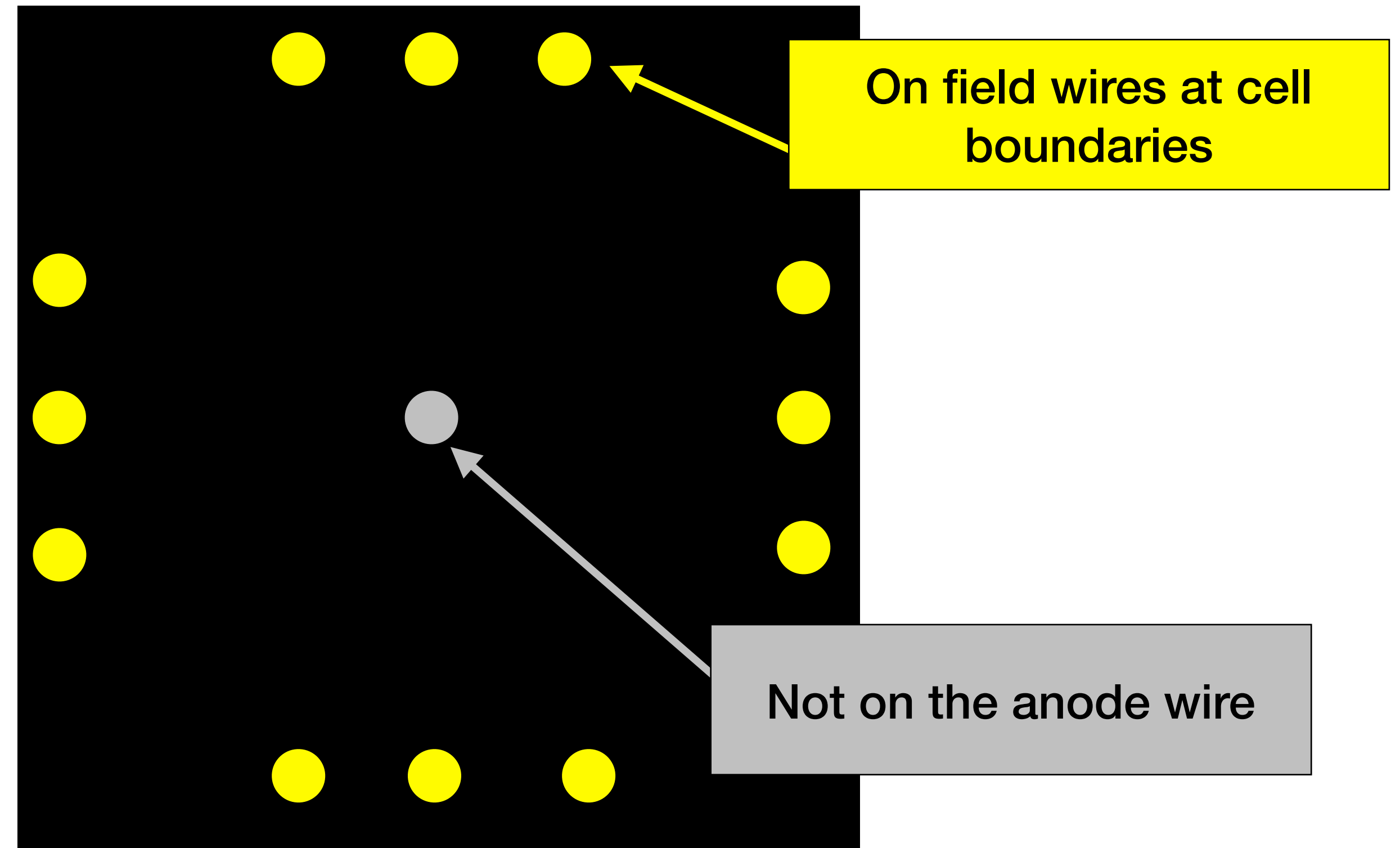
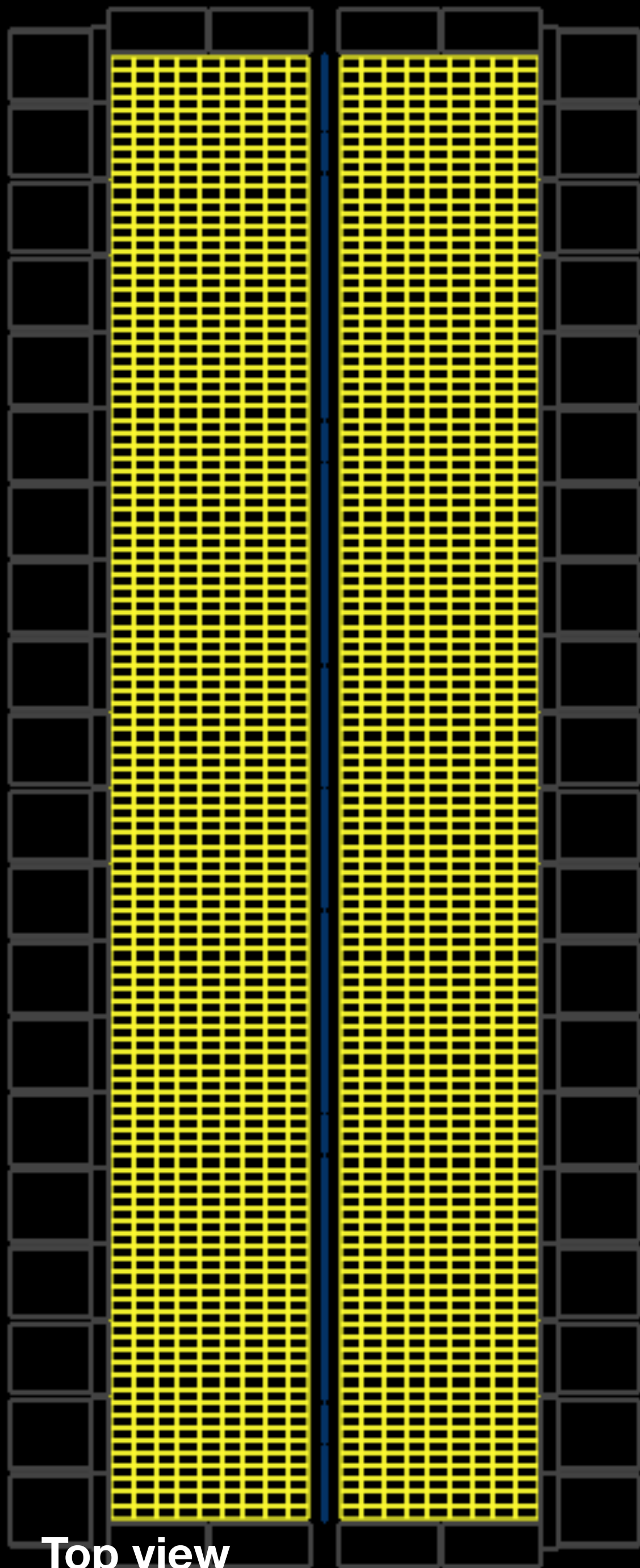
Top view

Zoomed view

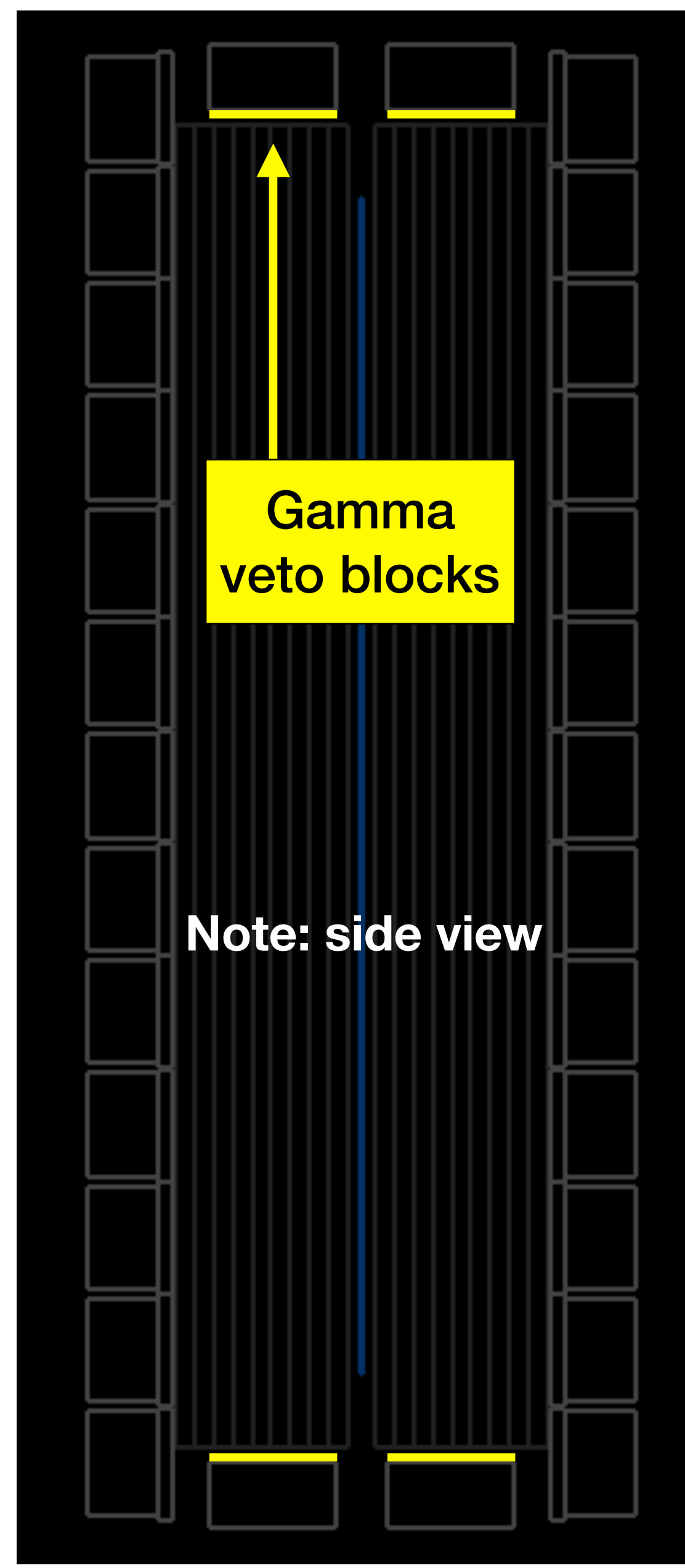
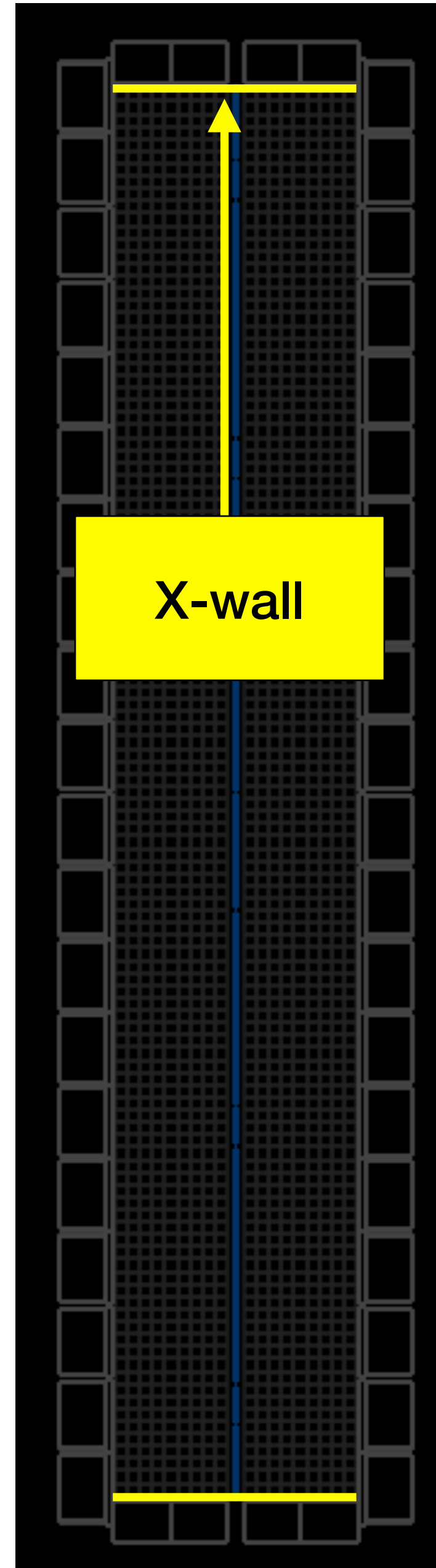
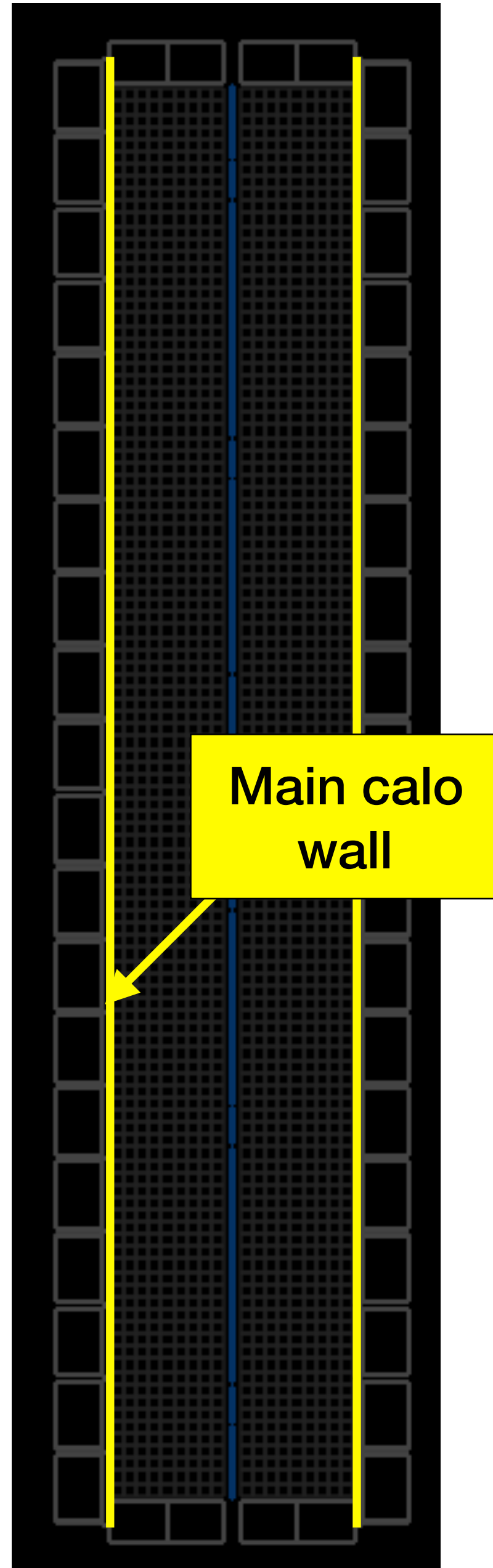
Surface of
all foils

field_wires_surface

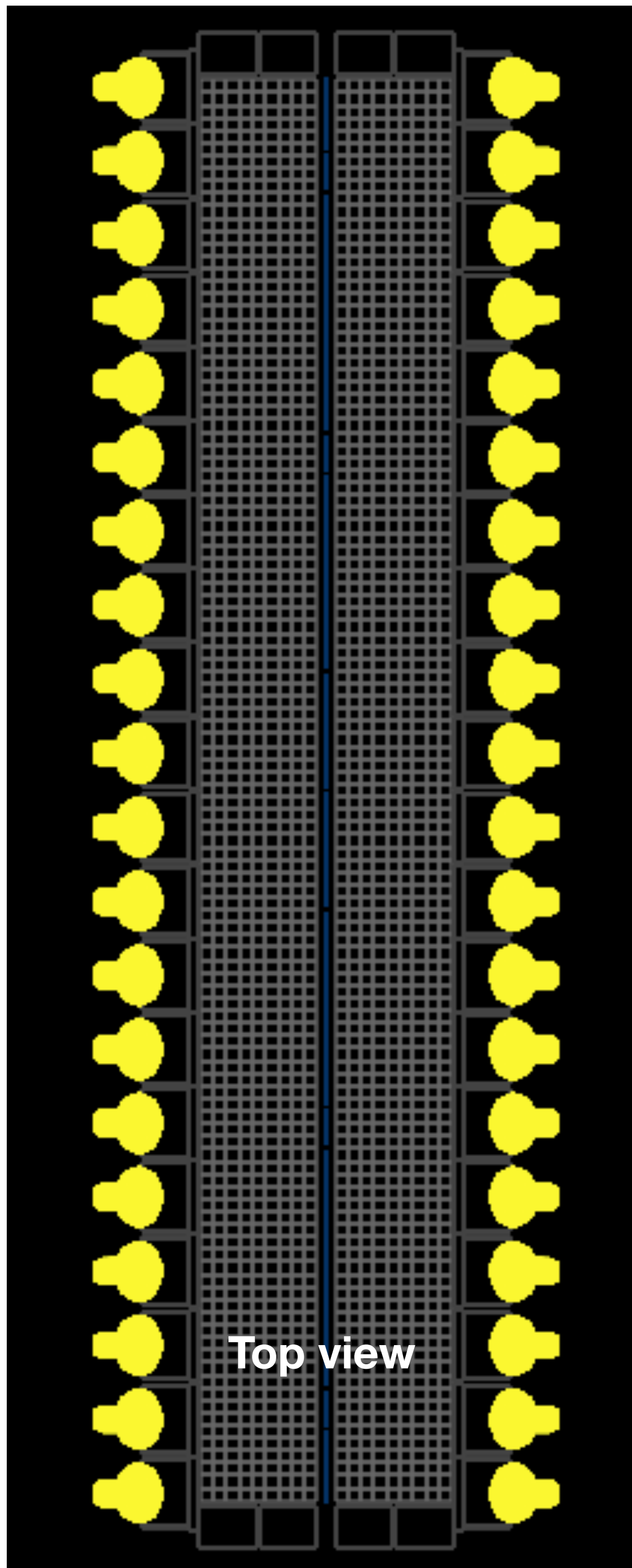
- Radon decaying in the tracker may deposit radioisotopes on the tracker wires (particularly ^{214}Bi Bi214_Po214)
- As the bismuth ions are positively charged, they are deposited on the field wires rather than the anode wires



calo_wrapper_surface xcalo_wrapper_surface gveto_wrapper_surface

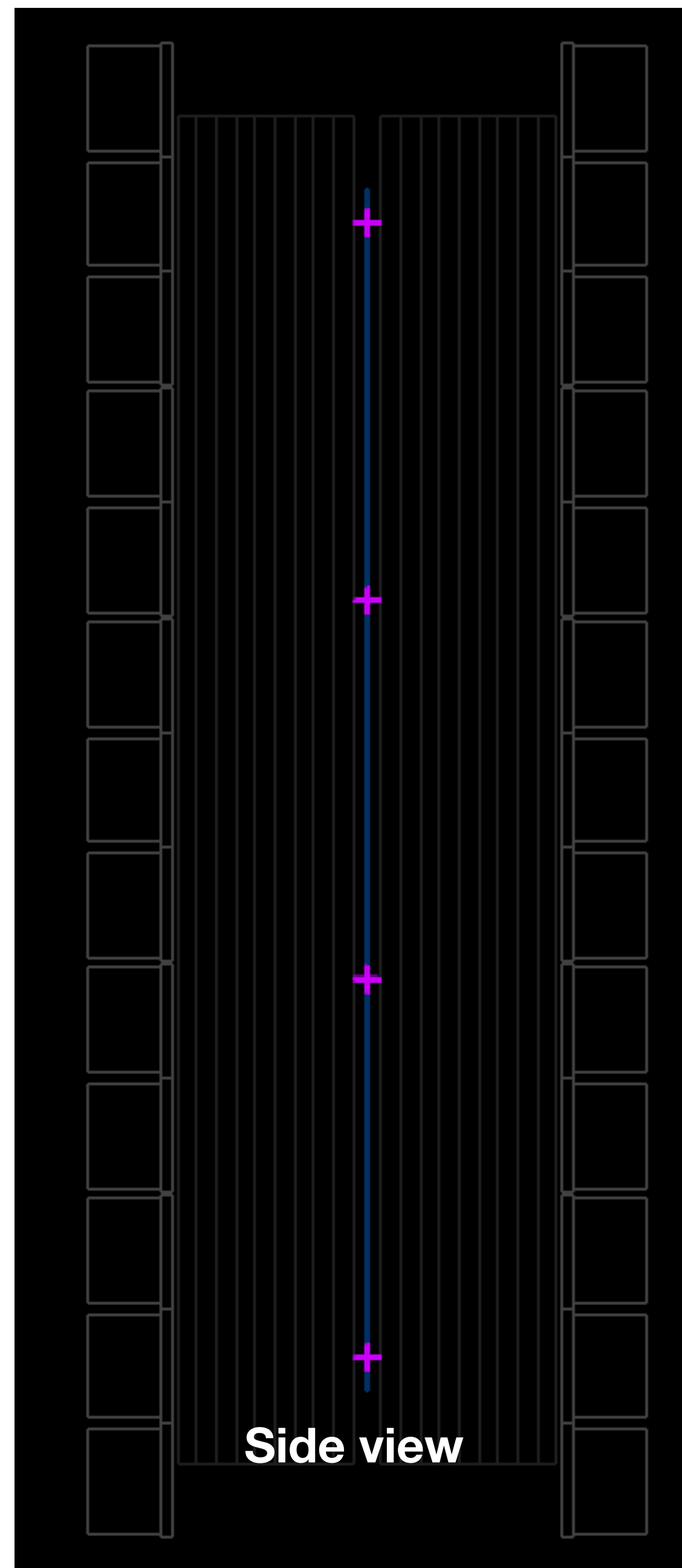
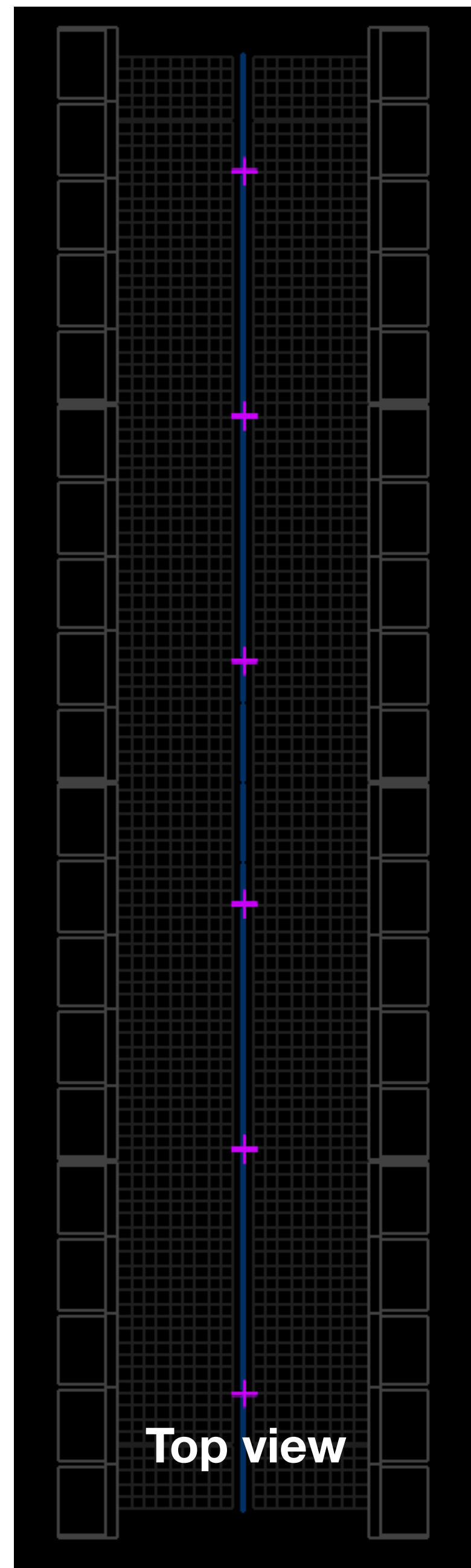


- One last place the daughters (particularly ^{214}Bi $\text{Bi}214_Po214$) of tracker radon can go - on the surface of the calorimeter walls
- MCC2 doesn't yet include these
- Plan is to add at least the main wall



`pmt_main_wall_glass_bulk`

- $2\nu\beta\beta$ measurements, in particular, could be affected by backgrounds from the PMT glass :Bi214_Po214, Tl208, K40
- Only the main wall PMTs are in the geometry at the moment (is that an expected behaviour)?



source_calibration_all_spots

- ^{207}Bi calibration sources can be deployed into the detector. Their positions are defined by the vertex generator `source_calibration_all_spots`
- Six columns between the source foils each deploy 4 small sources
- To enable the calibration sources, you will need to change the geometry of the detector. On the “Geometry” tab of `flsimulate-configure`, activate `source_calibration` to enable the `source_calibration_all_spots` vertex option
- For the standard sources, the primary event generator should be `Bi207`