Sensor size and tiling scheme
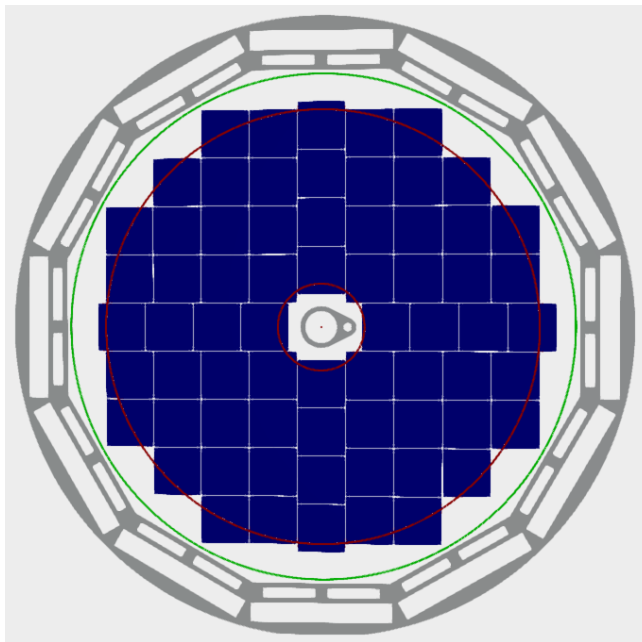

CAD model

GEANT model

anode base plate: inner side
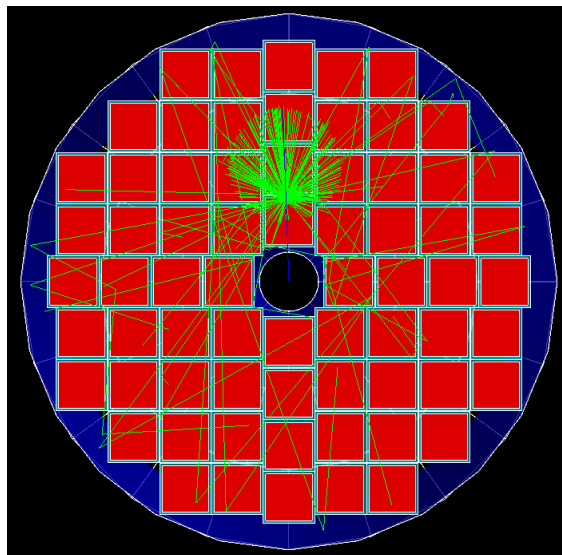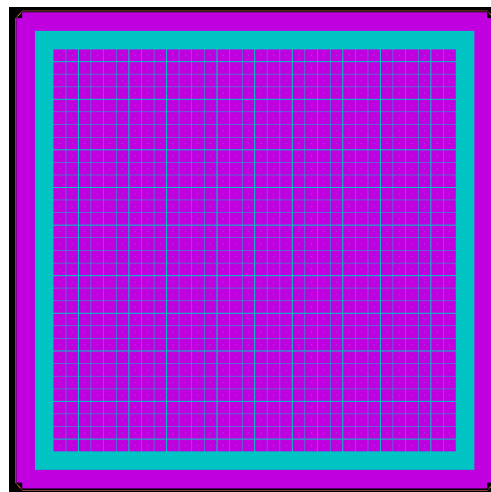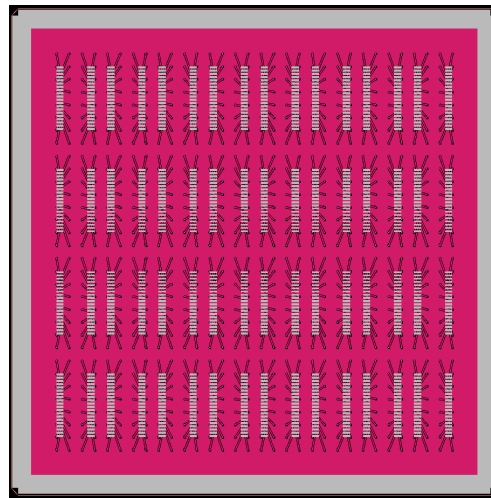

anode base plate: outer side

- Had a meeting with a new LTCC manufacturer in Poland on Monday

- A unified (as much as possible) sensor design for pfRICH and DIRC?

 - ~116mm -> 120-124mm size, "beam pipe flange friendly"

GEANT implementation

- Belle II aerogel parameterization

- Another iteration of sensor tiling scheme

- Mirror "pyramids" around HRPPD boundaries

- Aerogel tiling scheme

- Extended wavelength coverage

- Git repository: https://github.com/alexander-kiselev/pfRICH

- IRT: 4x5 optical paths per photon

- Detailed HRPPD description (window, photocathode layer, etc.)
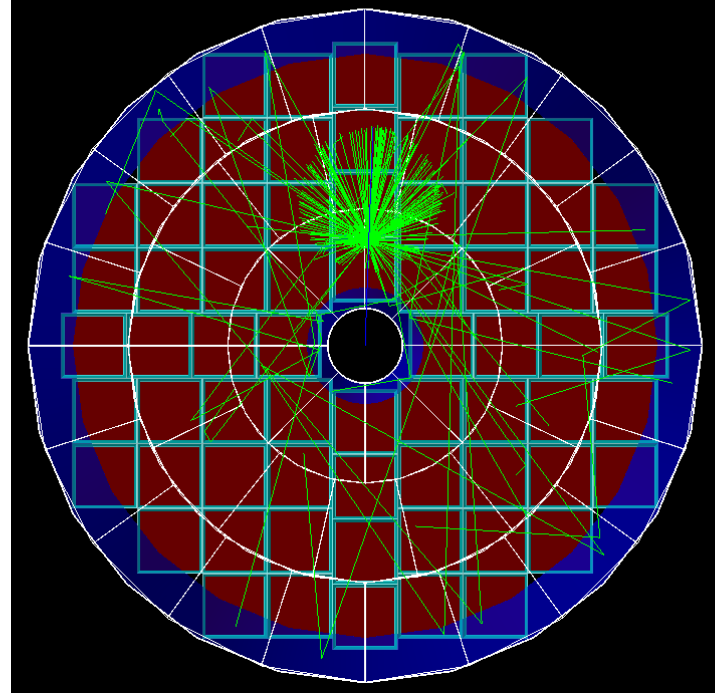
HRPPD evaluation
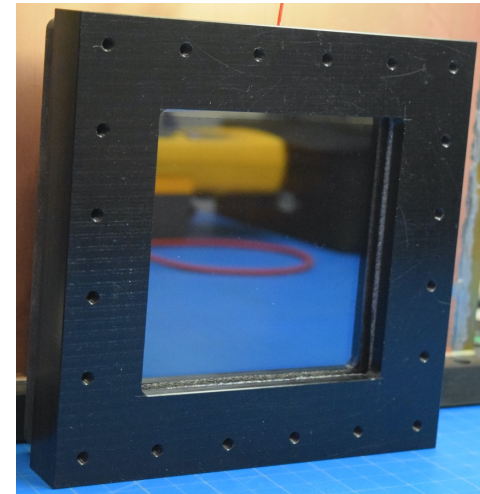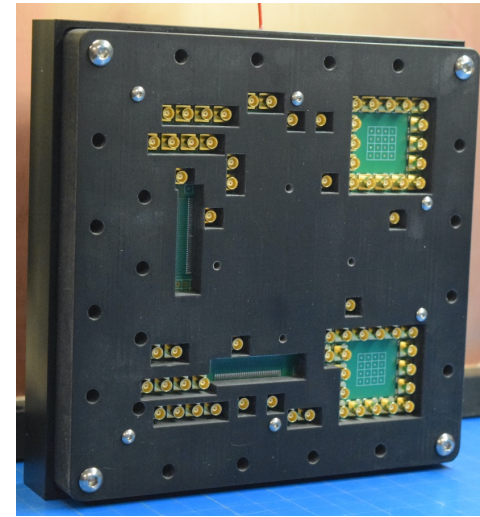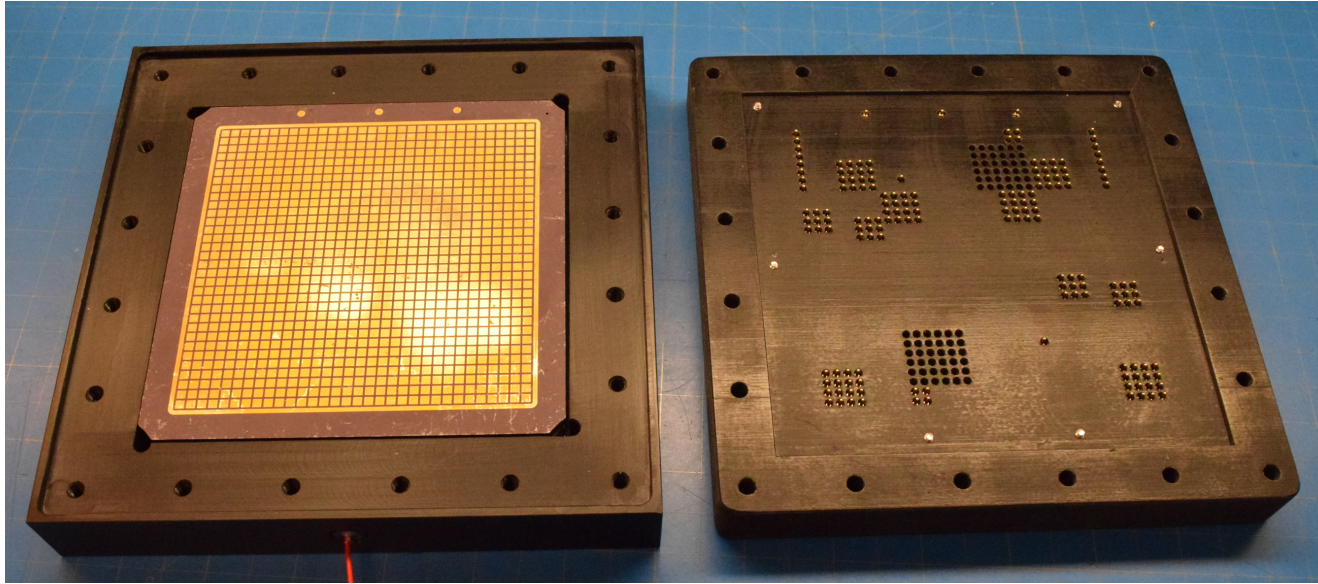
- All the ingredients are in place
- First tests will happen next week
  - Mark Popecki from Incom is coming to BNL

Wavelength range

- Is it really hopeless to work with aerogel in a deep UV range?

HRPPD 126 QE curve
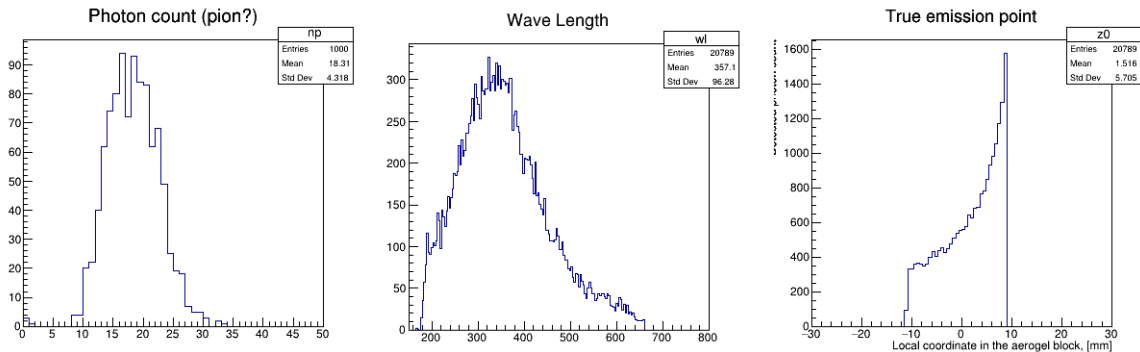

Belle II aerogel#1 in pfRICH GEANT simulations


```
<Property name="ABSLENGTH" unit="eV">
  <value energy="7.75">1.64386</value>
  <value energy="6.88889">5.77248</value>    ← ~5mm @ 180nm (units: [mm])
  <value energy="5.91945">11.8578</value>
  <value energy="5.42017">15.8411</value>
  <value energy="5.17722">21.314</value>
```

$$\frac{dE}{dx} = 4\pi^2 e^2 \int_{\beta n>1} \frac{1}{\lambda^3}\left(1 - \frac{1}{\beta^2 n^2}\right) d\lambda$$
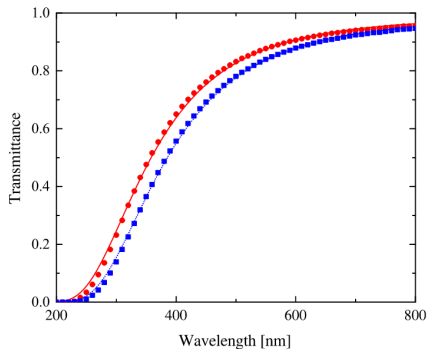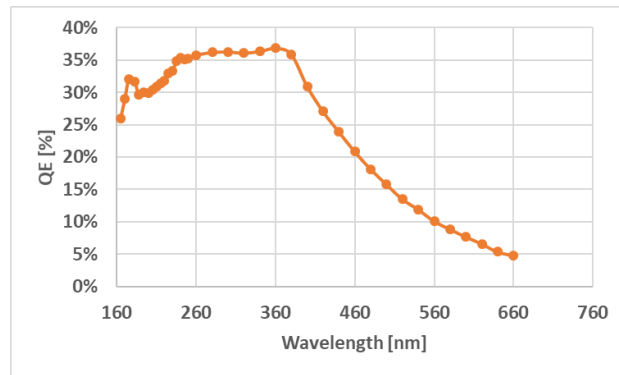
~5mm @ 250nm (units: [mm])

Fig. 2. Transmittance as a function of wavelength for the Belle II RICH aerogel samples of n = 1.045 (red) and 1.055 (blue) [2]. The thickness for both samples is 20 mm . (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Obviously, more studies needed

```
<Property name="RAYLEIGH" unit="eV">
  <value energy="1.500">495.305</value>
  <value energy="1.675">368.992</value>
  <value energy="1.850">276.148</value>
  <value energy="2.025">208.910</value>
  <value energy="2.200">159.280</value>
  <value energy="2.375">122.311</value>
  <value energy="2.550">94.4909</value>
  <value energy="2.725">73.5915</value>
  <value energy="2.900">58.2796</value>
  <value energy="3.075">46.5131</value>
  <value energy="3.250">37.2842</value>
  <value energy="3.425">30.1133</value>
  <value energy="3.600">24.4282</value>
  <value energy="3.775">19.7740</value>
  <value energy="3.950">16.1085</value>
  <value energy="4.125">13.0108</value>
  <value energy="4.300">10.6804</value>
  <value energy="4.475">8.74212</value>
  <value energy="4.650">7.22615</value>
  <value energy="4.825">6.03070</value>
  <value energy="5.000">5.02443</value>
  <value energy="5.175">4.3785</value>
  <value energy="5.350">3.8331</value>
  <value energy="5.525">3.3701</value>
  <value energy="5.700">2.9749</value>
```