

First studies with dRICH prototypes

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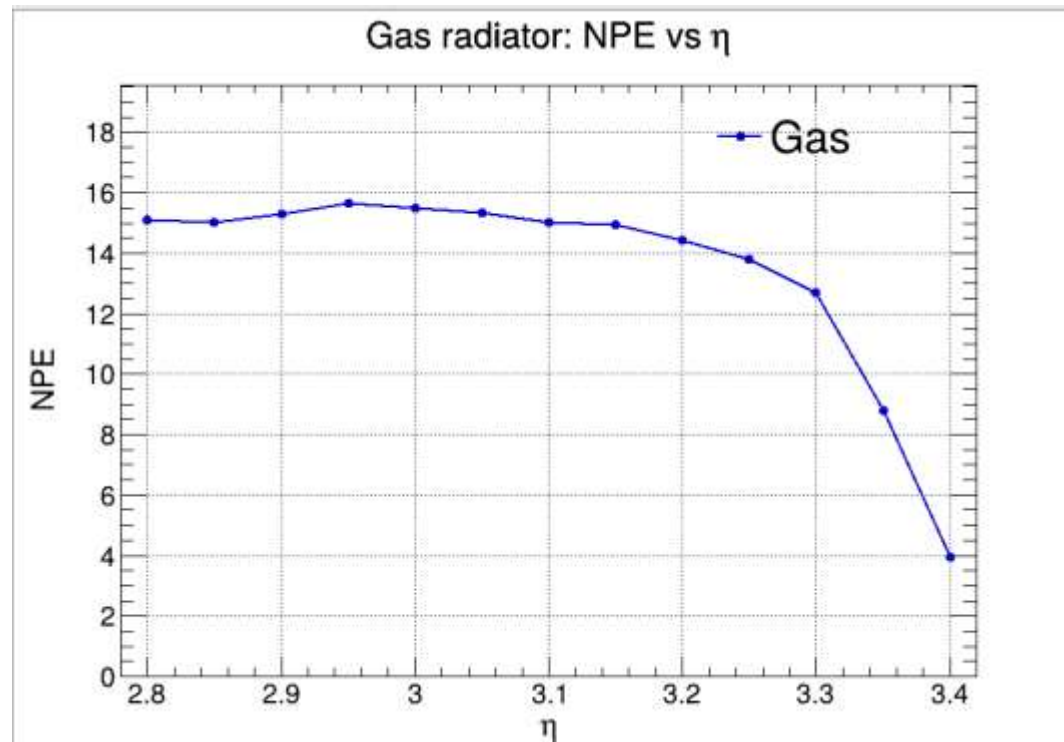
NPE vs eta for single sector:

2000 proton ,

$p = 180 \text{ GeV}/c$,

$\Phi = 180 \text{ deg}$

$\eta = 2.80, 2.85, 2.90, 2.95, 3.0, 3.05, 3.10, 3.15, 3.2, 3.25, 3.3, 3.35, 3.4$



SPR vs eta for single sector:

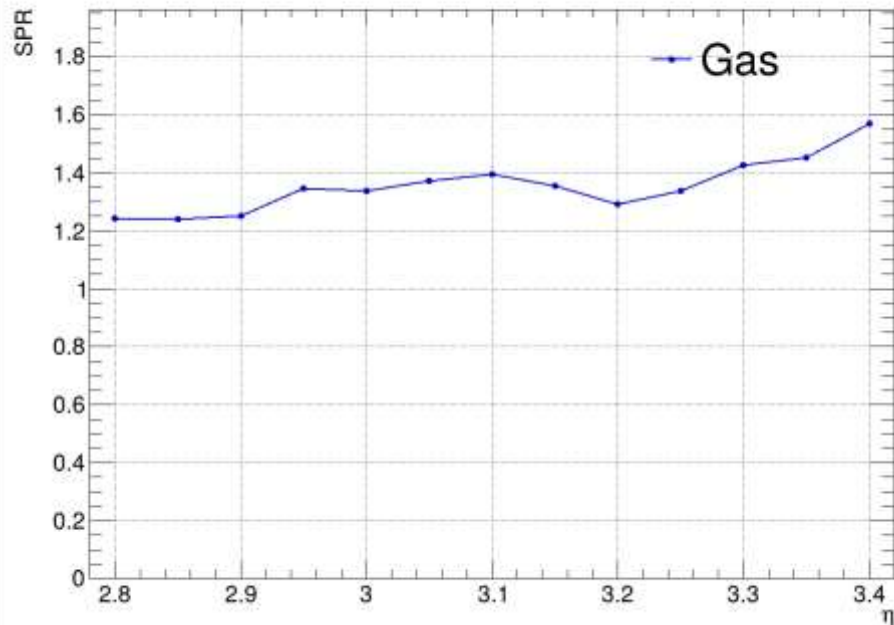
2000 proton ,

$p = 180 \text{ GeV}/c$,

$\Phi = 180 \text{ deg}$

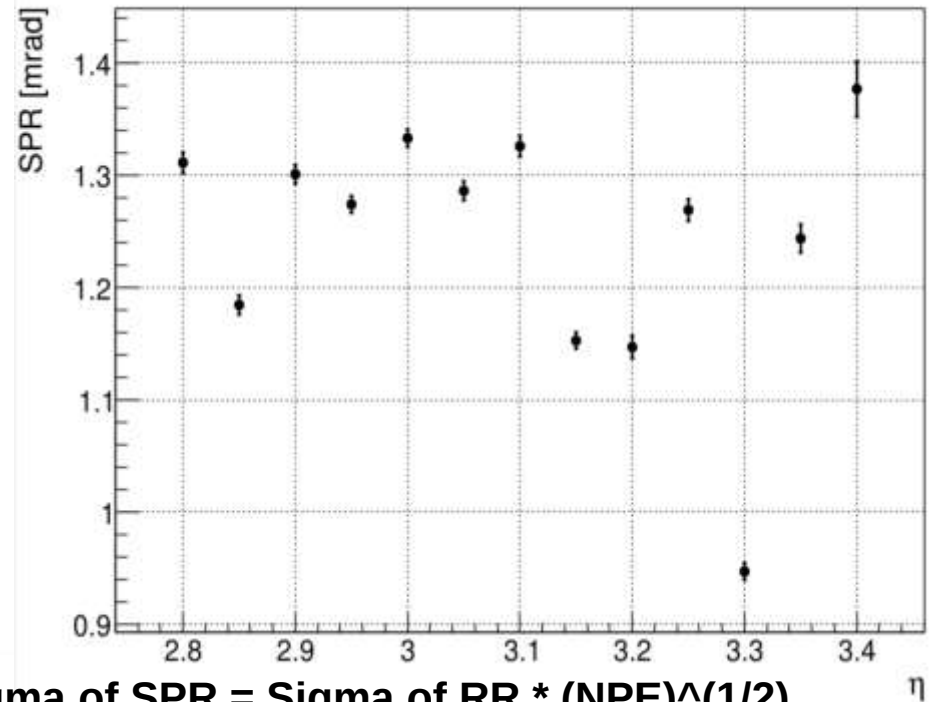
$\eta = 2.80, 2.85, 2.90, 2.95, 3.0, 3.05, 3.10, 3.15, 3.2, 3.25, 3.3, 3.35, 3.4$

Gas radiator: SPR vs η



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Single Photon Resolution vs η , gas



$\sigma_{\text{SPR}} = \sigma_{\text{RR}} * (\text{NPE})^{(1/2)}$

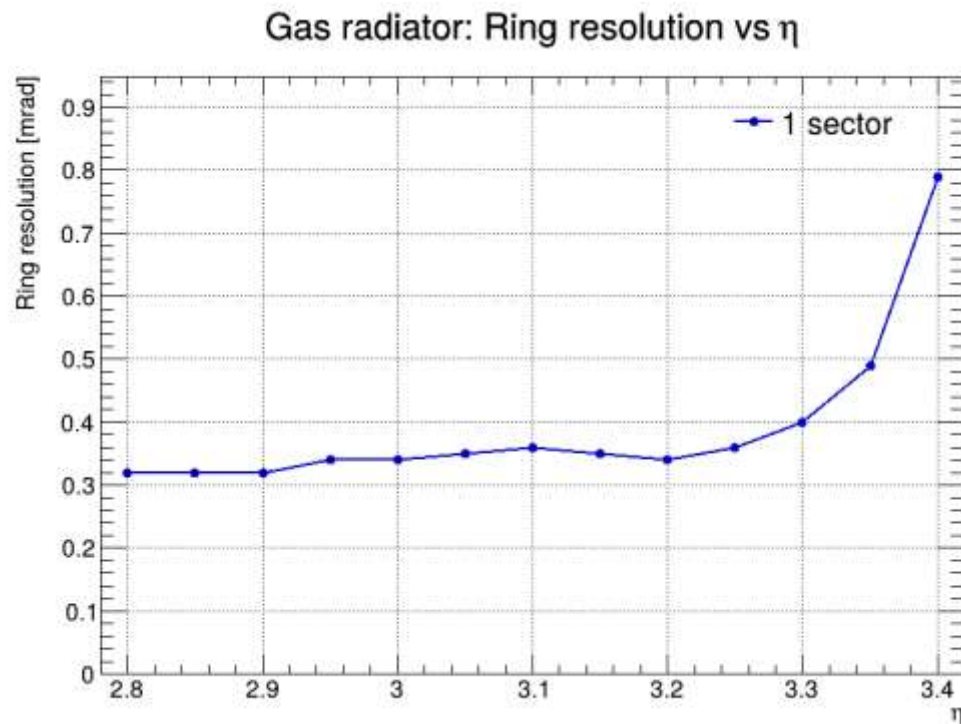
Ring Resolution vs eta for single sector:

2000 proton ,

$p = 180 \text{ GeV}/c$,

$\Phi = 180 \text{ deg}$

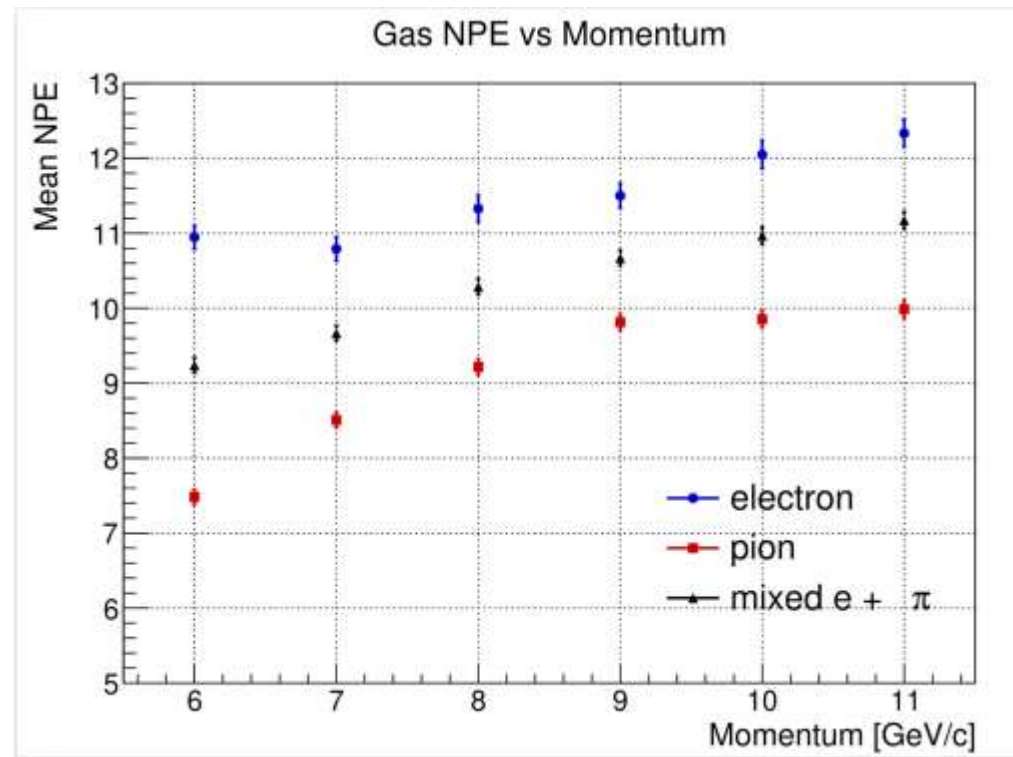
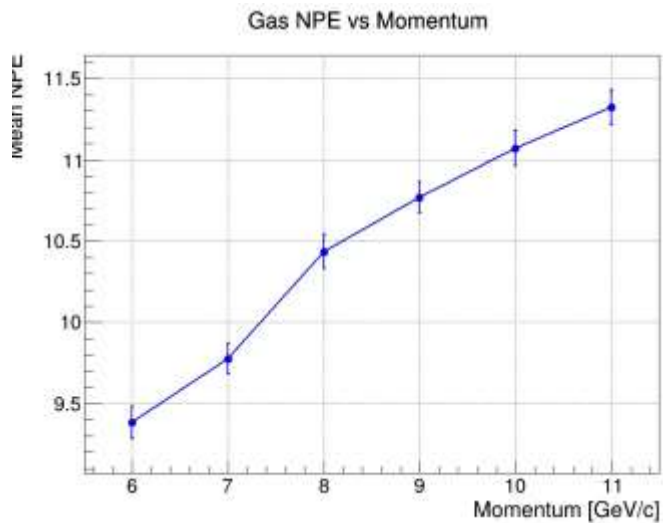
$\text{Eta} = 2.80, 2.85, 2.90, 2.95, 3.0, 3.05,$
 $3.10, 3.15, 3.2, 3.25, 3.3, 3.35, 3.4$



NPE vs momentum for single sector:

2000 electron& Pion

$\text{Eta} = 3.3$

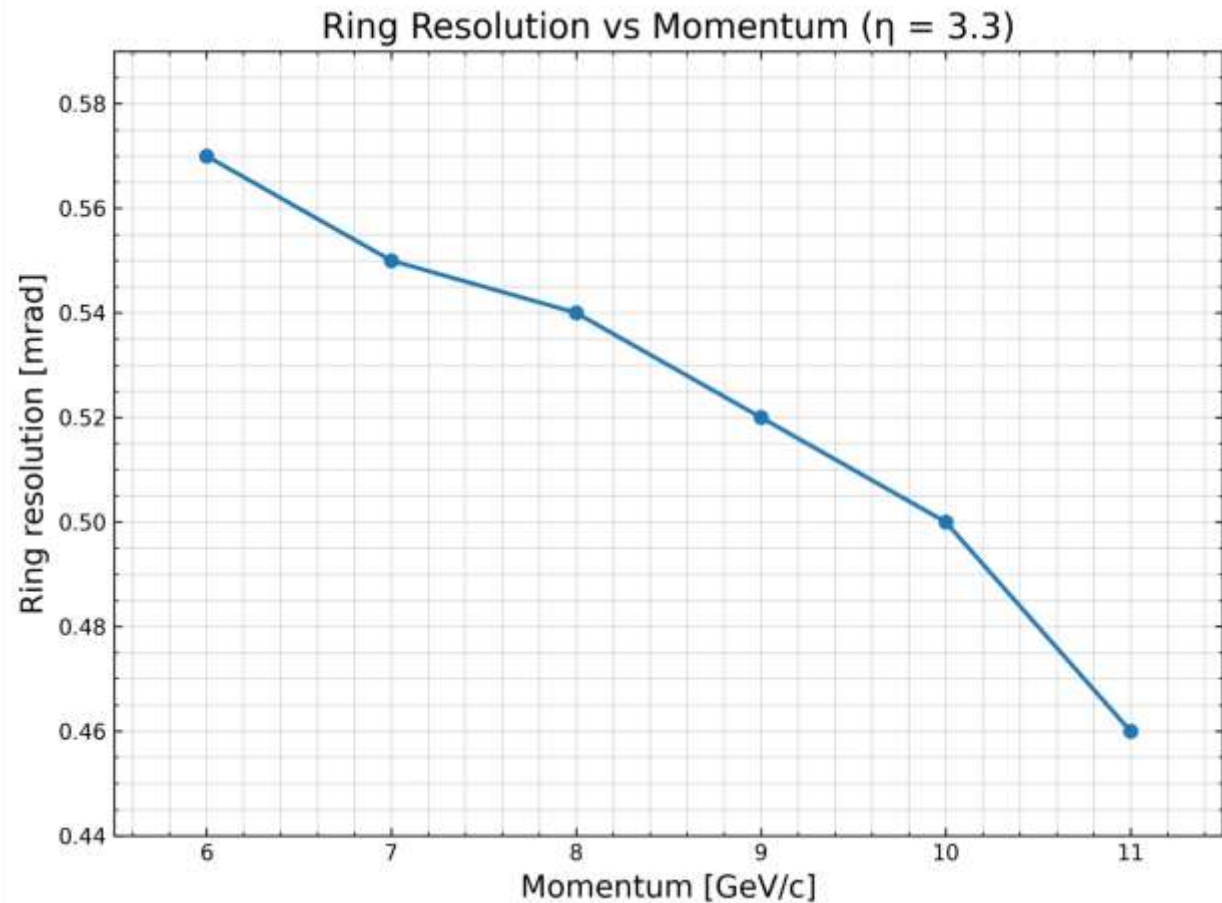


Ring Resolution vs momentum for single sector:

2000 pion & electron

$\Phi = 180$ deg

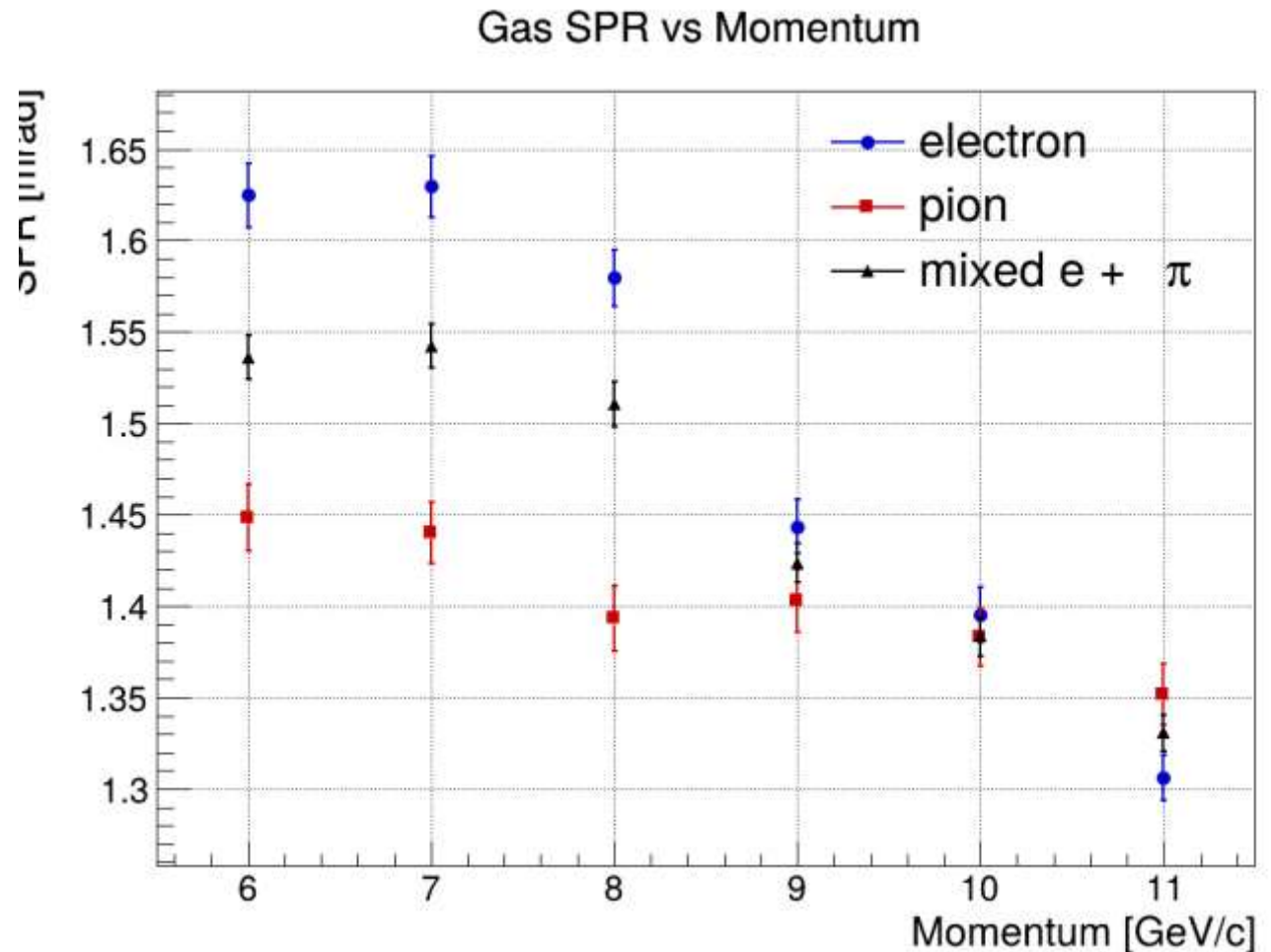
$\eta = 3.3$



SP Resolution vs momentum for single sector:

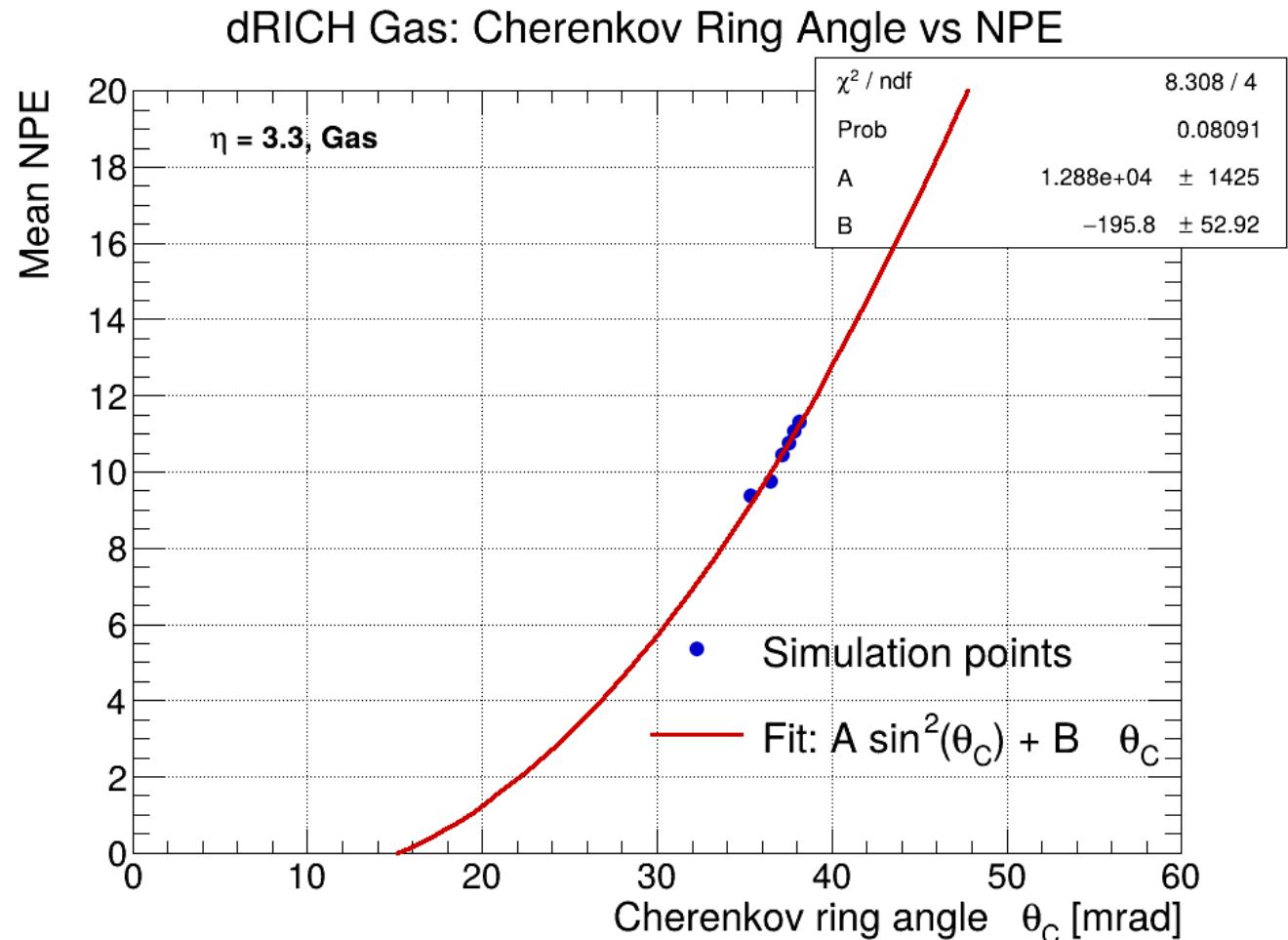
2000 electron & pion,

$\text{Eta} = 3.3$



Cherenkov ring angle vs NPE for single sector and fit Frank and Tamm

2000 e & pion
Eta = 3.3



Back up



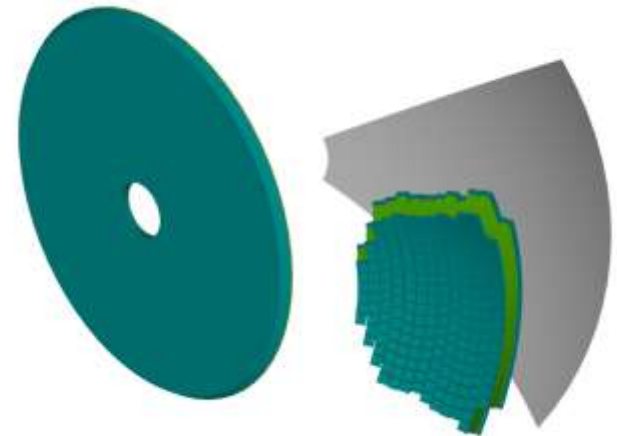
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Single sector geometry:

DRICH_geo.cpp:

```
// SECTOR LOOP //////////////////////////////////////  
for (int isec = 0; isec < nSectors; isec++) {  
  
    // debugging filters, limiting the number of sectors  
    if (debugSector && isec != 0)  
        continue;  
  
    // sector rotation about z axis  
    RotationZ sectorRotation((isec + 0.5) * 2 * M_PI / nSectors);  
    std::string secName = "sec" + std::to_string(isec);
```



For a single sector:

$nSectors=1$ and $isec=0$ so:

$\Phi = (0 + 0.5) * 2 * M_PI / 1 = 180 \text{ deg}$,
so in 1-sector geometry, the single sector is centered at 180 deg .

For whole sectors:

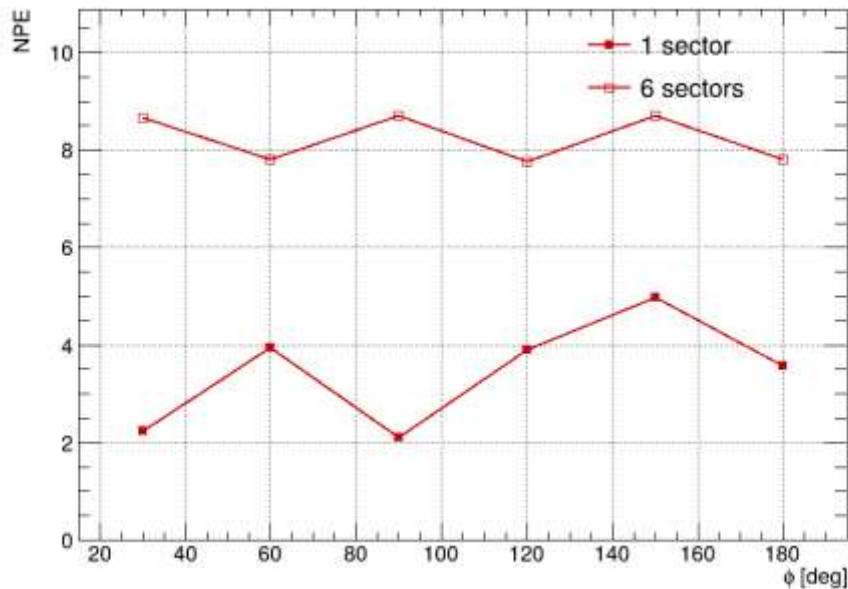
$nsectors = 6$ and $isec=0$ $\phi = 30$

But in the normal 6-sector geometry, **sector 0** is centered at 30 deg .

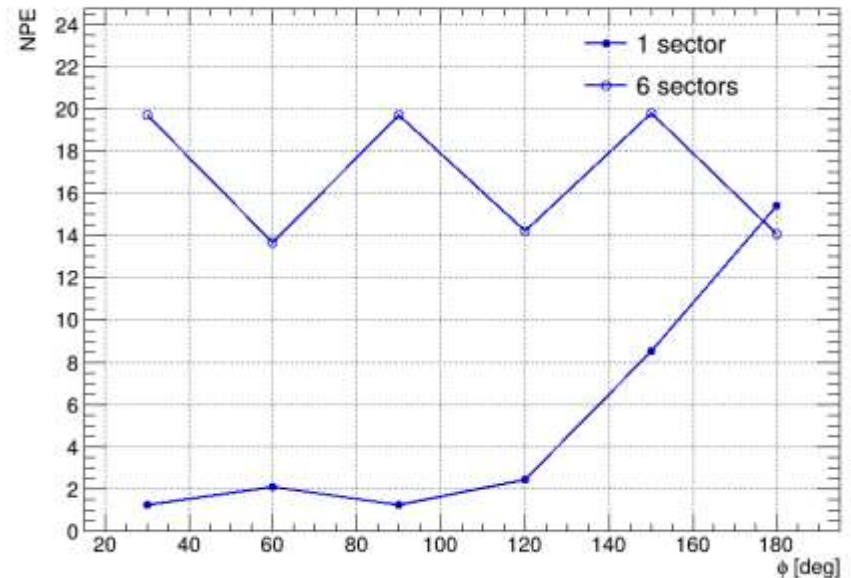
NPE vs phi (comparing two geometry single sector and whole sector):

2000 proton ,
 $p = 180 \text{ GeV/c}$,
 $\eta = 3$,
Phi values: 30, 60, 90, 120, 150, 180 deg

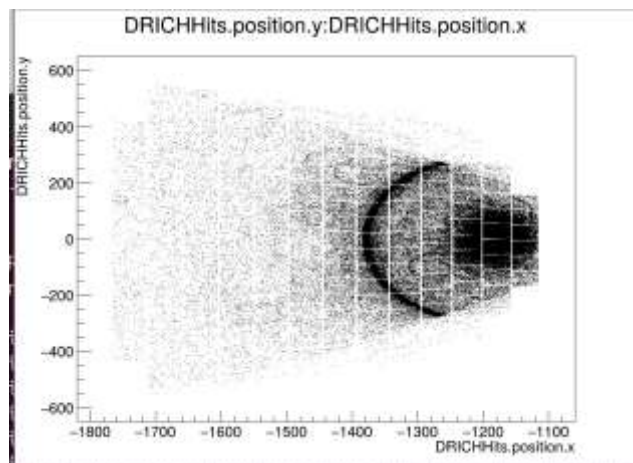
Aerogel radiator: NPE vs ϕ



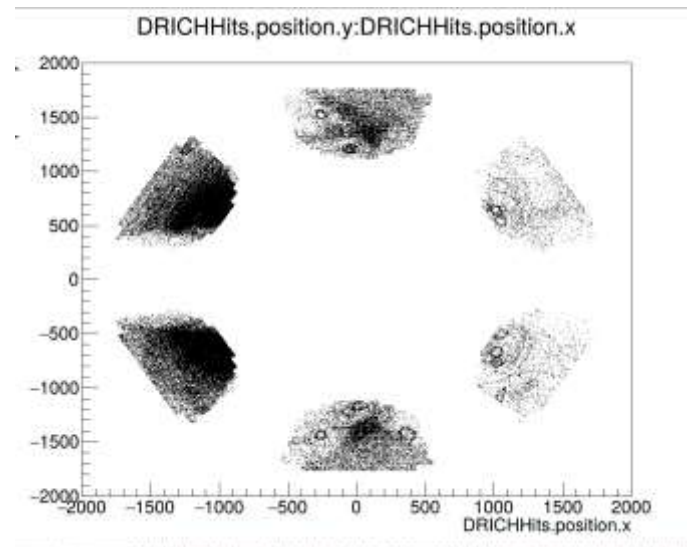
Gas radiator: NPE vs ϕ



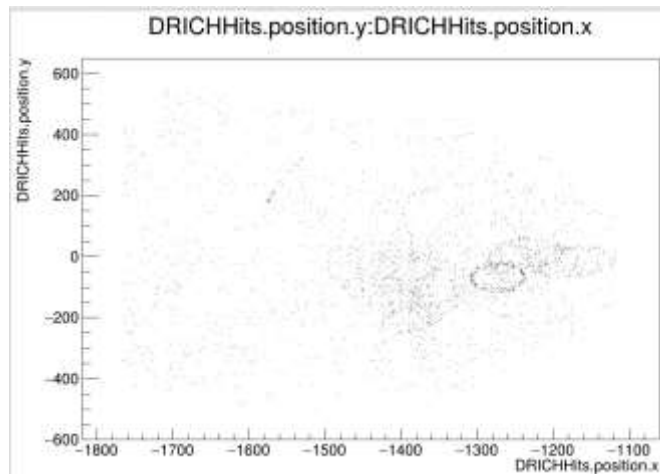
Hitting position for:



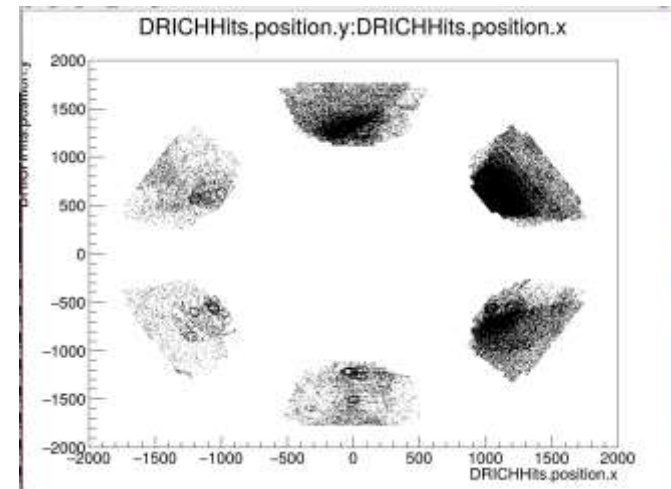
single sector at $\phi = 180$ deg



whole sector at $\phi = 180$ deg



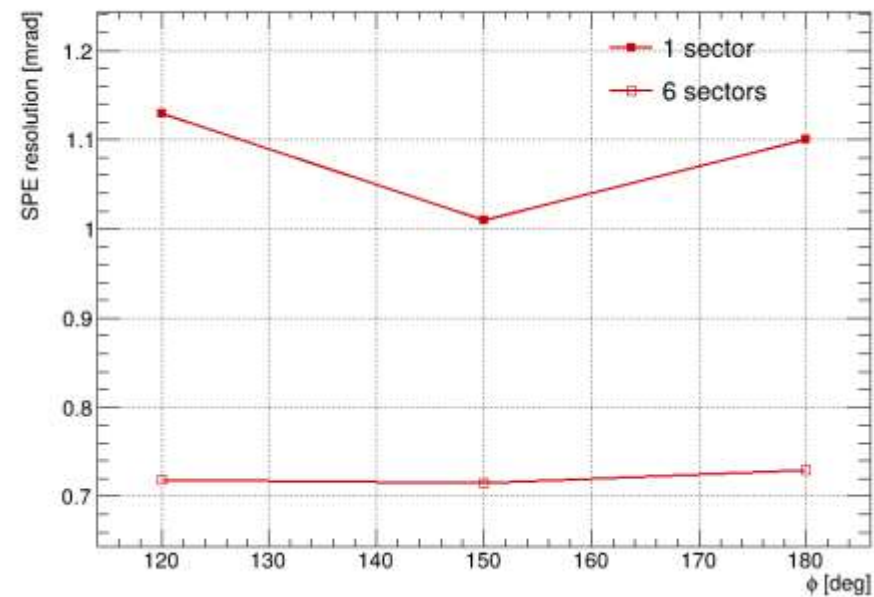
single sector at $\phi = 30$ deg



whole sector at $\phi = 30$ deg

SPE vs phi :

Aerogel radiator: SPE resolution vs ϕ



Gas radiator: SPE resolution vs ϕ

