Status of DRICH analysis

RESULTS FOR CROMATIC ABERRATION CONTRIBUTION

Analysis details

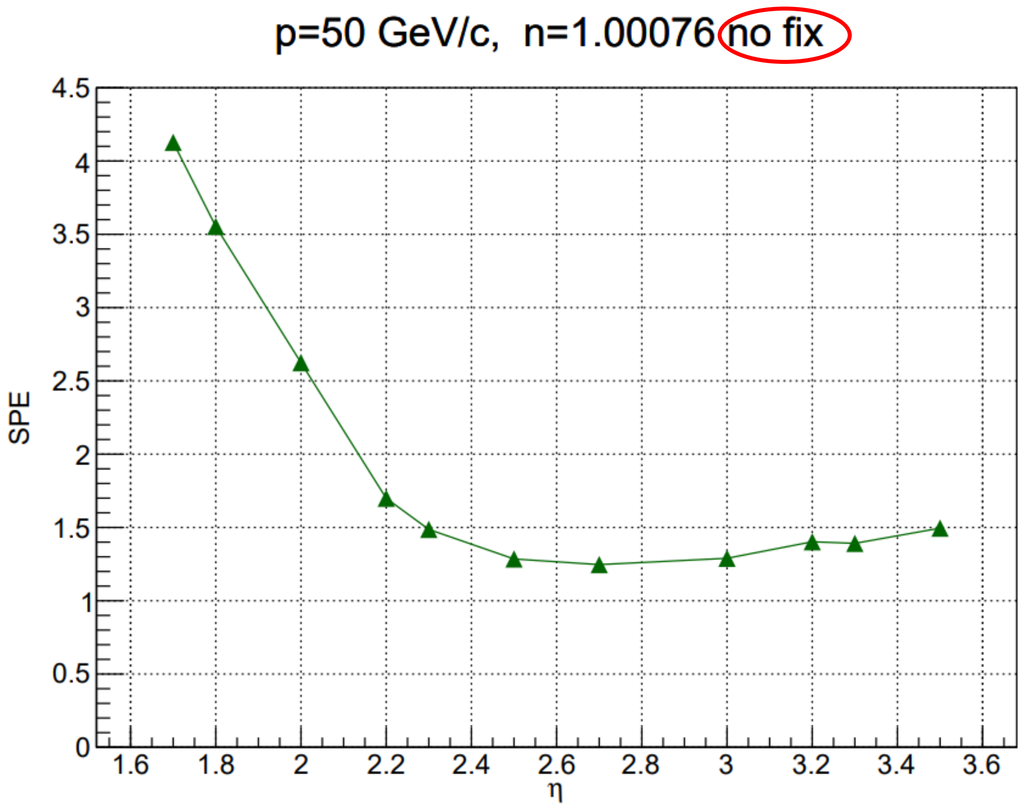
- To calculate the contribution of chromatic aberration I ran simulations both with the refractive index fixed and with the lambda dependency.
- 1000 events.
- PID: 211
- Momentum fixed:
  - For gas @ 50 GeV/c.
  - For aerogel @ 15 GeV/c.
- Different bins of η.

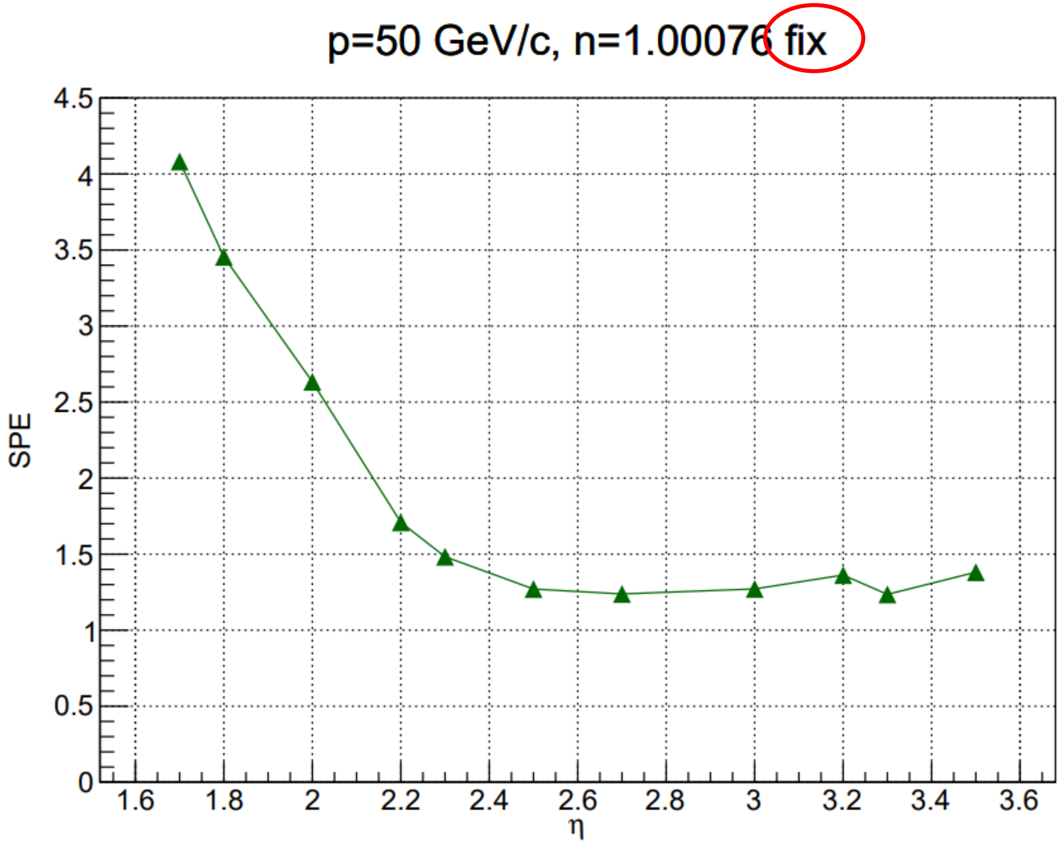
```
  4.89411*eV   1.001406
  6.19921*eV   1.001489
  "/>
<matrix name="ABSLENGTH__C4F10_PFRICH" coldim="2" values="
  1.23984*eV  6.0*m
  6.19921*eV  6.0*m
  "/>
<!-- dRICH aerogel, for density=0.11 g/cm3 -->
<matrix name="RINDEX__Aerogel_DRICH" coldim="2" values="
  1.23984*eV  1.01826
  1.28348*eV  1.01828
  1.33030*eV  1.01829
  1.38067*eV  1.01831
  1.43500*eV  1.01833
  1.49379*eV  1.01835
  1.55759*eV  1.01838
  1.62709*eV  1.01840
  1.70308*eV  1.01844
  1.78652*eV  1.01847
  1.87855*eV  1.01852
  1.96673*eV  1.01856
  2.05490*eV  1.01861
  2.14308*eV  1.01866
  2.23126*eV  1.01871
  2.31943*eV  1.01876
  2.40761*eV  1.01881
  2.49579*eV  1.01887
  2.58396*eV  1.01893
  2.67214*eV  1.01899
  2.76032*eV  1.01905
  2.84849*eV  1.01912
  2.93667*eV  1.01919
  3.02485*eV  1.01926
  3.11302*eV  1.01933
  3.20120*eV  1.01941
  3.28938*eV  1.01948
  3.37755*eV  1.01956
  3.46573*eV  1.01965
  3.55391*eV  1.01973
  3.64208*eV  1.01982
  3.73026*eV  1.01991
  3.81844*eV  1.02001
  3.90661*eV  1.02010
  3.99479*eV  1.02020
  4.08297*eV  1.02030
  4.17114*eV  1.02041
  4.25932*eV  1.02052
                                                  612,20        57%
```

epic/compact/optical_materials.xml

GAS

- Single photon resolution (SPE) w and w/o n=1.00076 fix.



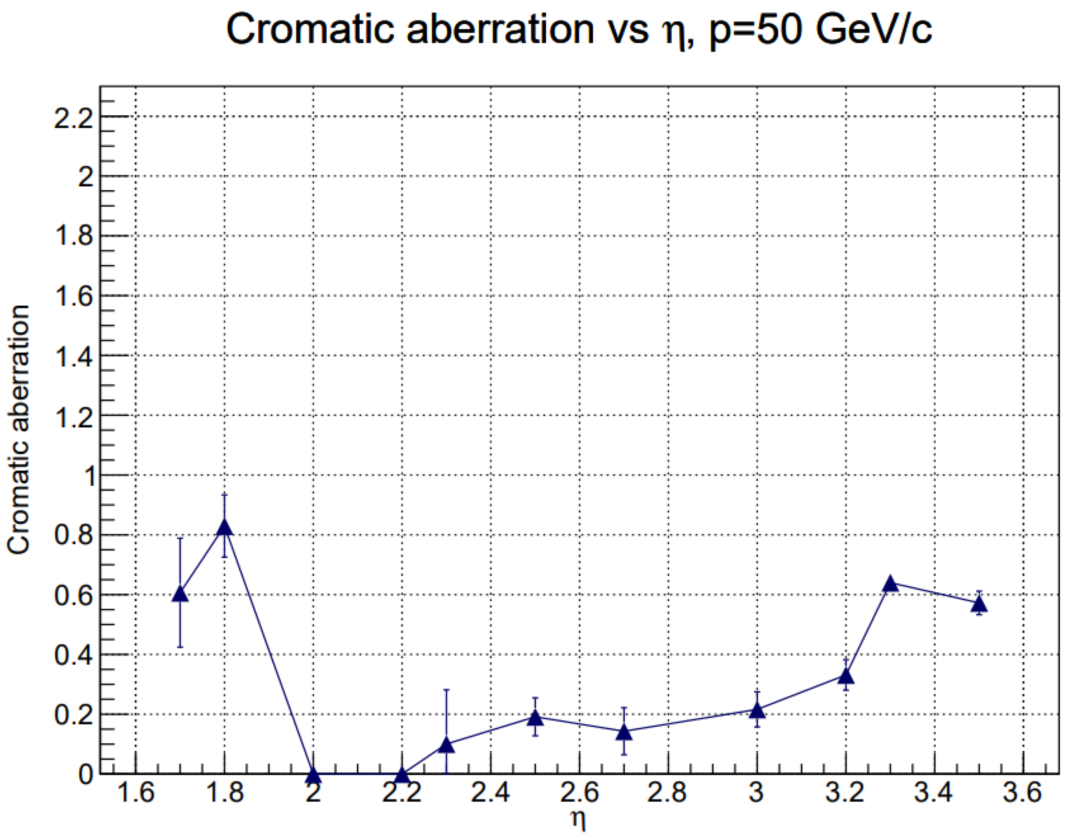


GAS

- Evaluation of the contribution of chromatic aberration as a function of pseudorapidity, fixing momentum @ 50 GeV/c.

$$\sigma_{\{cromatic\ aberration\}} = \sqrt{\sigma_{tot}^2 - \sigma_{without-crom-ab}^2}$$

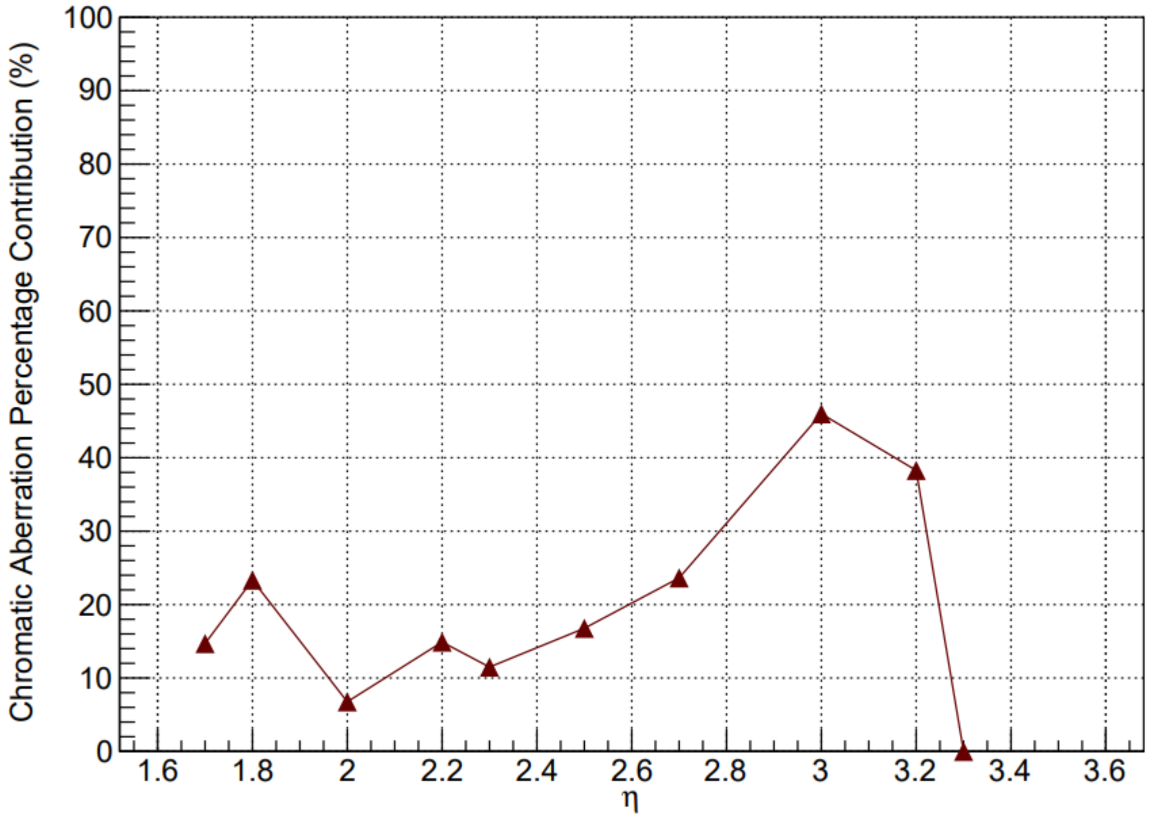
Where σ_{tot}^2 is σ with λ dependency and $\sigma_{without-crom-ab}^2$ is σ with n fixed (w/o λ dependency).



GAS

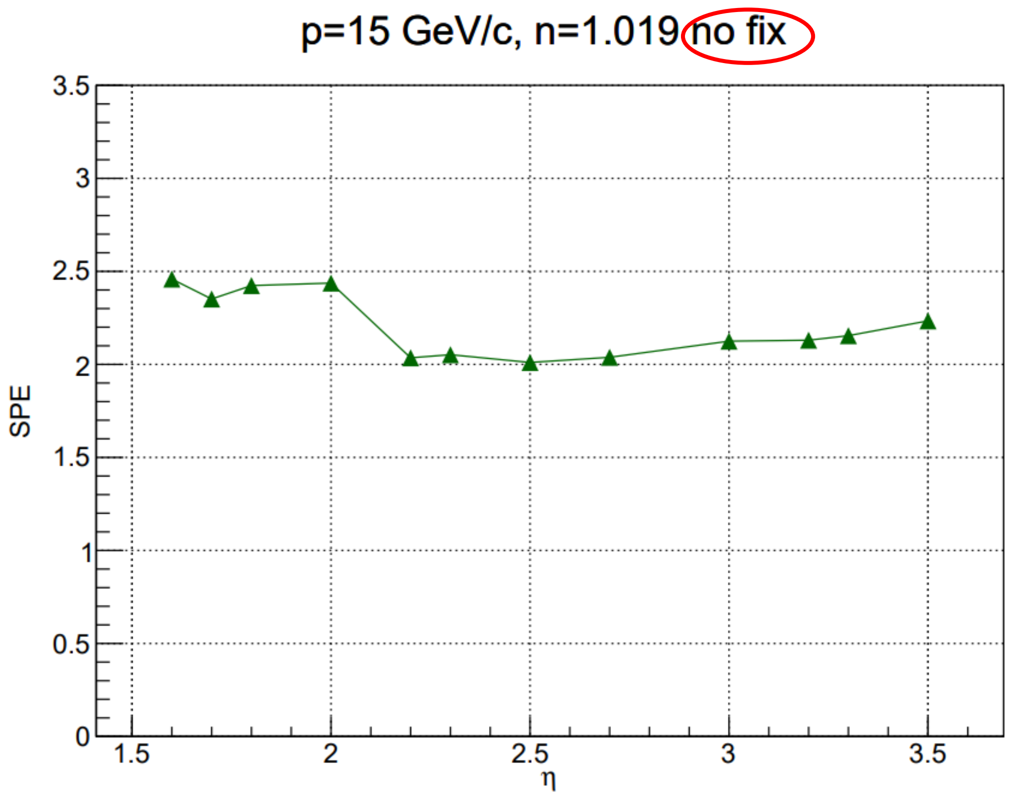
- Evaluation of the percentage contribution of chromatic aberration as a function of pseudorapidity, fixing momentum @ 50 GeV/c.

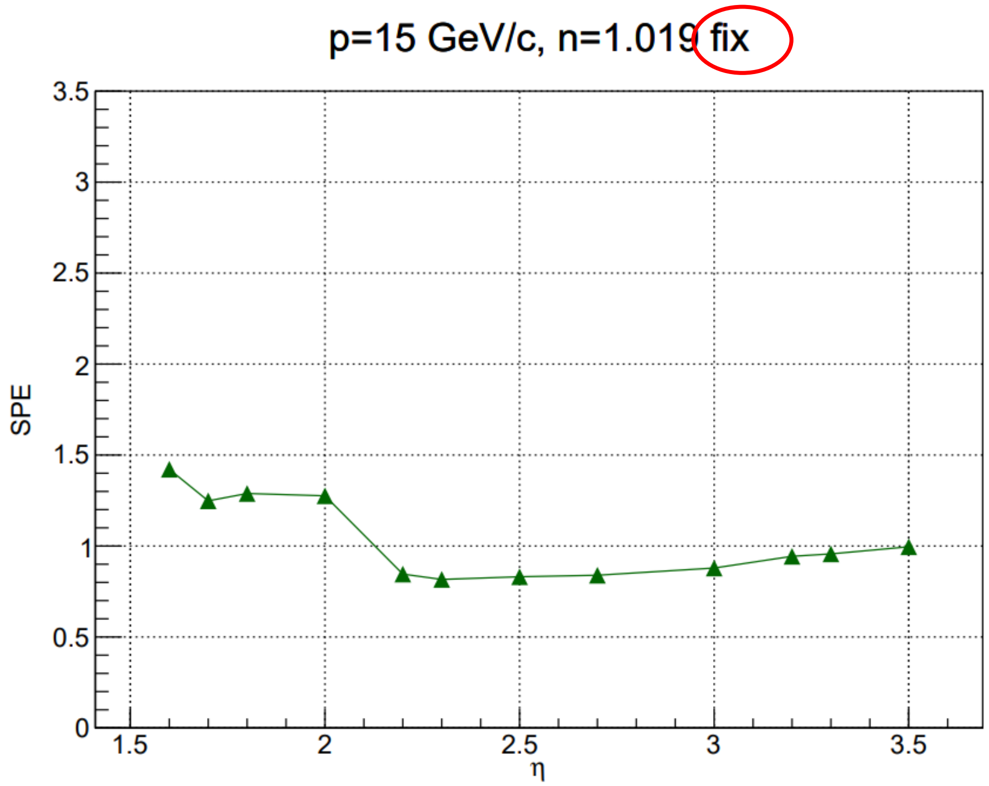
$$\frac{\sigma_{\{cromatic\ aberration\}}}{\sigma_{tot}} * 100$$



OLD AEROGEL (n=1.019)

- Single photon resolution (SPE) w and w/o n=1.019 fix.



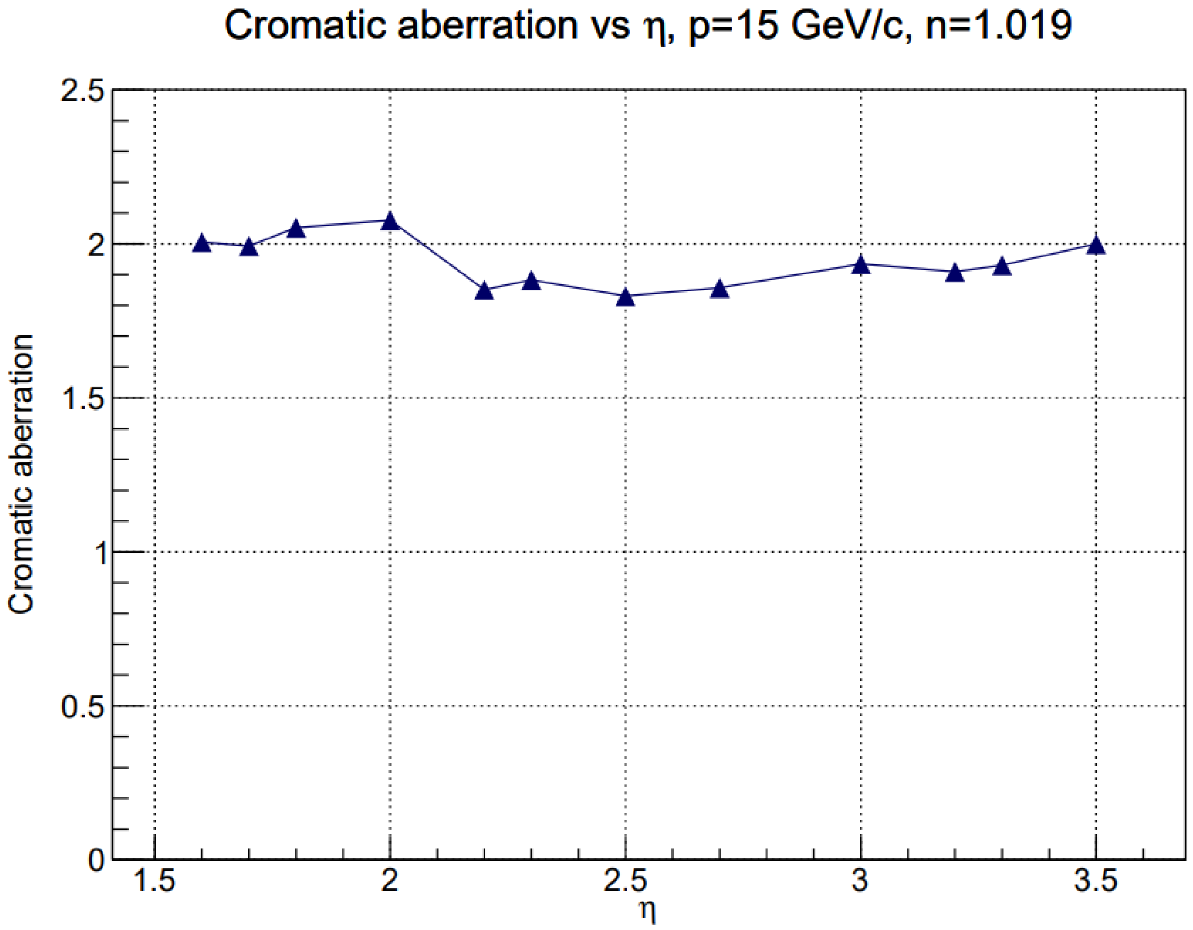


OLD AEROGEL (n=1.019)

- Evaluation of the contribution of chromatic aberration as a function of pseudorapidity, fixing momentum @ 15 GeV/c.

$$\sigma_{\{cromatic\ aberration\}} = \sqrt{\sigma_{tot}^2 - \sigma_{without-crom-ab}^2}$$

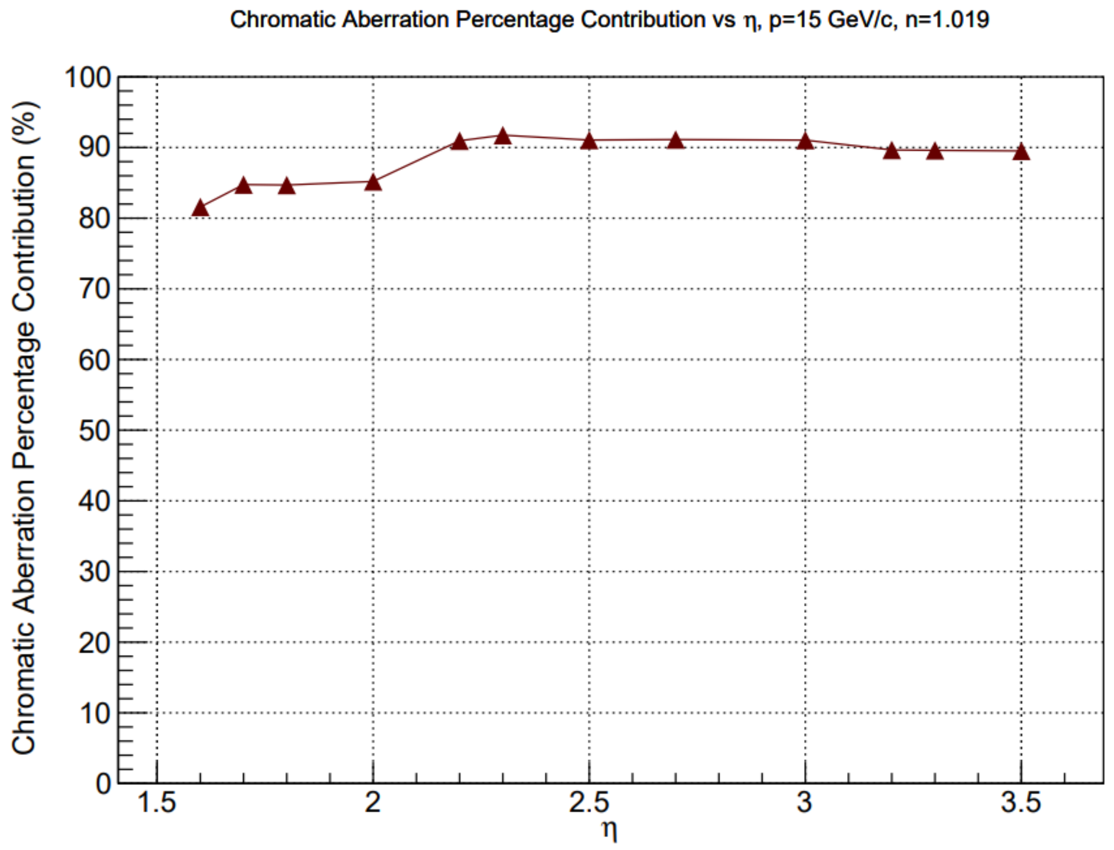
Where σ_{tot}^2 is σ with λ dependency and $\sigma_{without-crom-ab}^2$ is σ with n fixed (w/o λ dependency).



OLD AEROGEL (n=1.019)

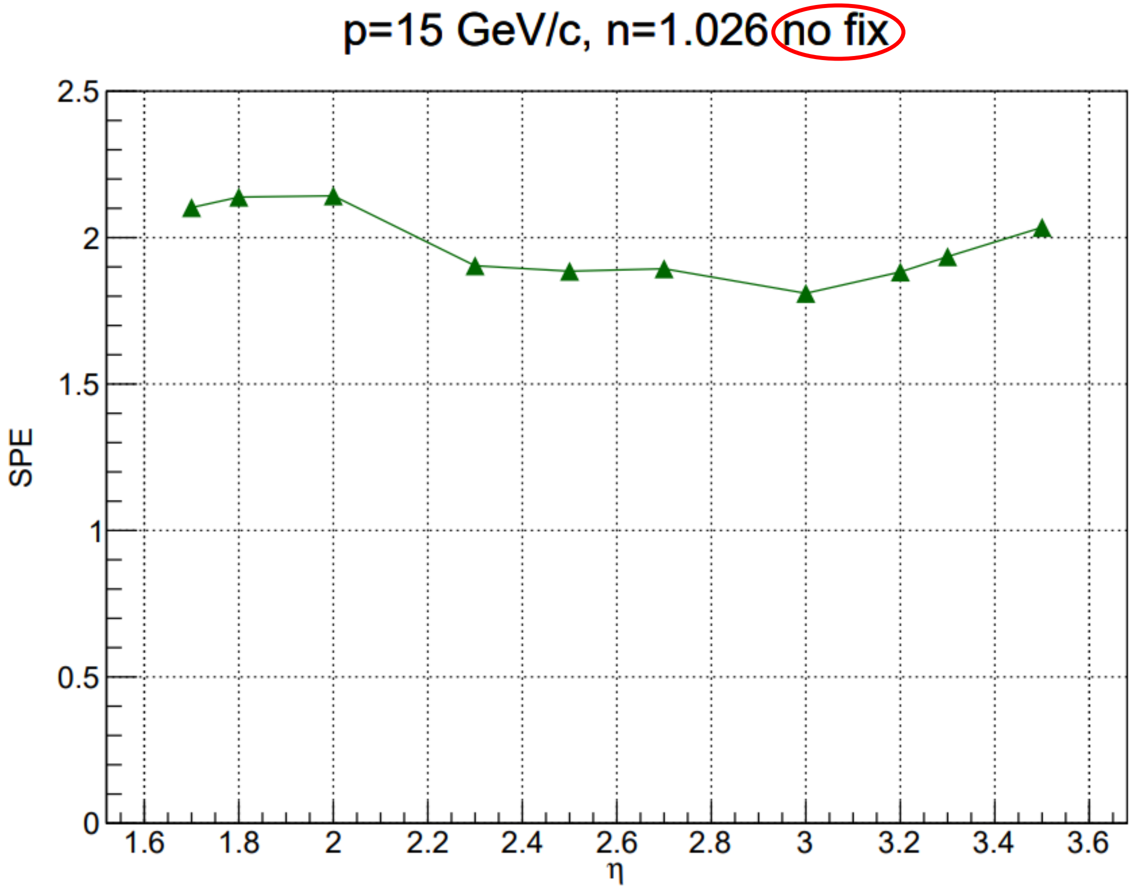
- Evaluation of the percentage contribution of chromatic aberration as a function of pseudorapidity, fixing momentum @ 15 GeV/c.

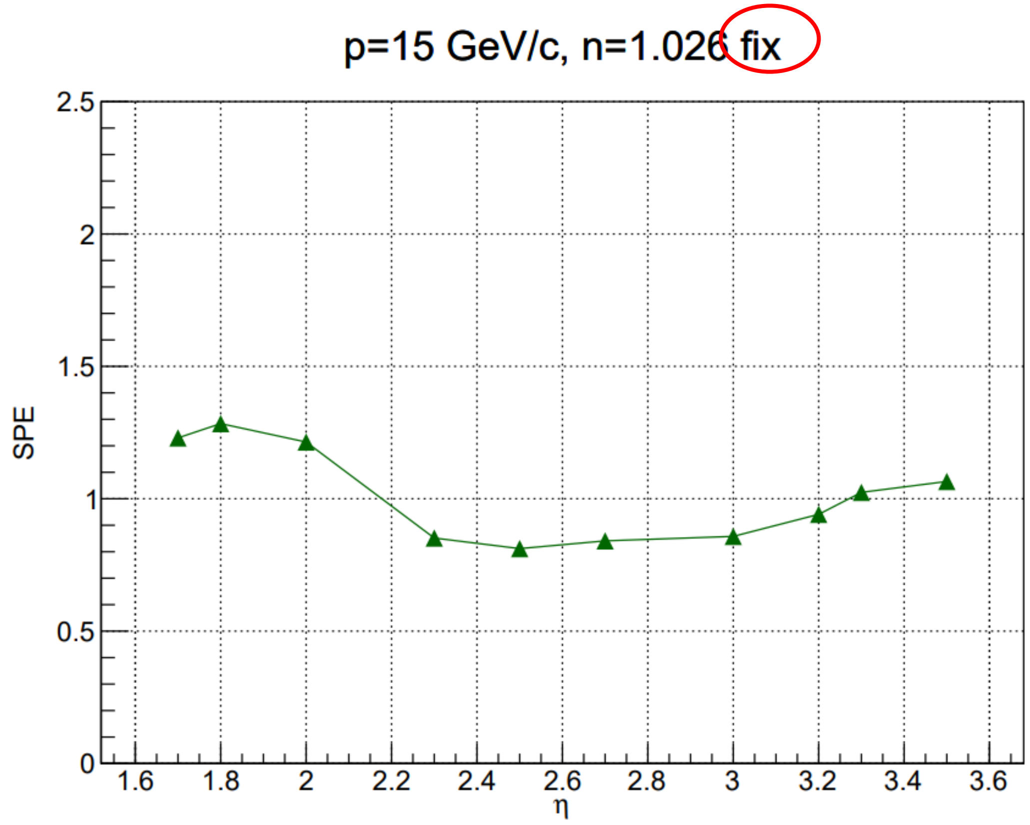
$$\frac{\sigma_{\{cromatic\ aberration\}}}{\sigma_{tot}} * 100$$



NEW AEROGEL (n=1.026)

- Single photon resolution (SPE) w and w/o n=1.026 fix.



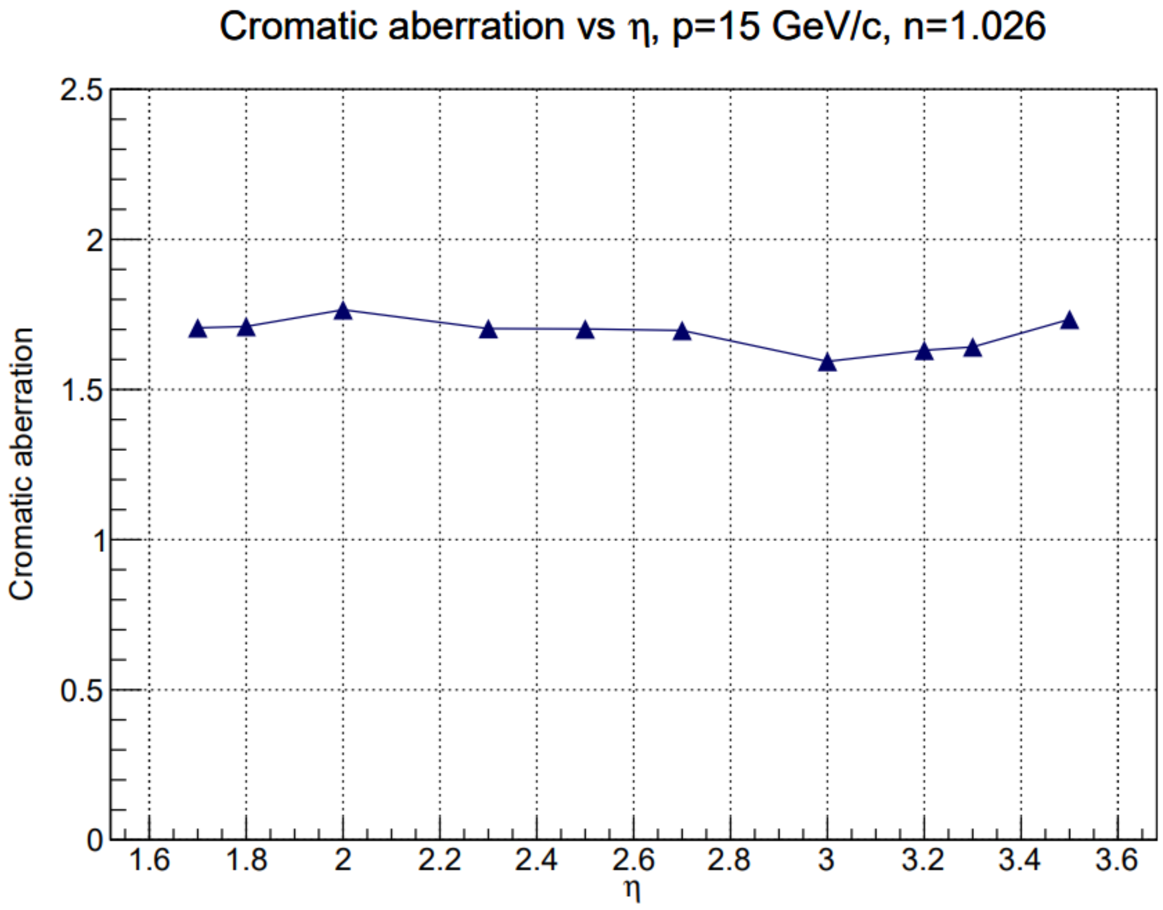


NEW AEROGEL (n=1.026)

- Evaluation of the contribution of chromatic aberration as a function of pseudorapidity, fixing momentum @ 15 GeV/c.

$$\sigma_{\{cromatic\ aberration\}} = \sqrt{\sigma_{tot}^2 - \sigma_{without-crom-ab}^2}$$

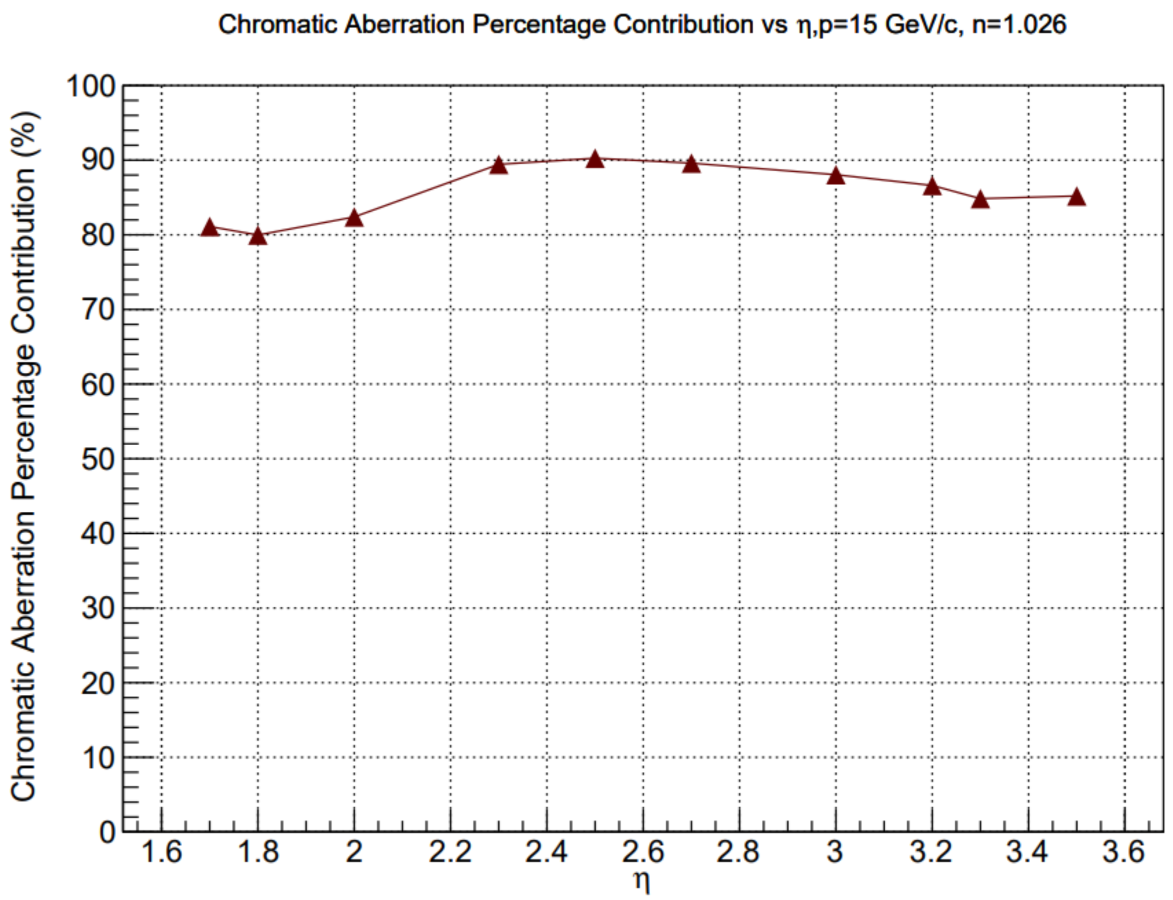
Where σ_{tot}^2 is σ with λ dependency and $\sigma_{without-crom-ab}^2$ is σ with n fixed (w/o λ dependency).



NEW AEROGEL (n=1.026)

- Evaluation of the percentage contribution of chromatic aberration as a function of pseudorapidity, fixing momentum @ 15 GeV/c.

$$\frac{\sigma_{\{cromatic\ aberration\}}}{\sigma_{tot}} * 100$$



CONCLUSION

- Chromatic aberration has a greater weight in aerogel than in gas.

- The contribution of chromatic aberration calculated for the new aerogel (n=1.026) is smaller than the contribution obtained for the old aerogel (n=1.019).