Aerogel RICH Beamtest 2004 Jun

Experimental Plan and measurement list

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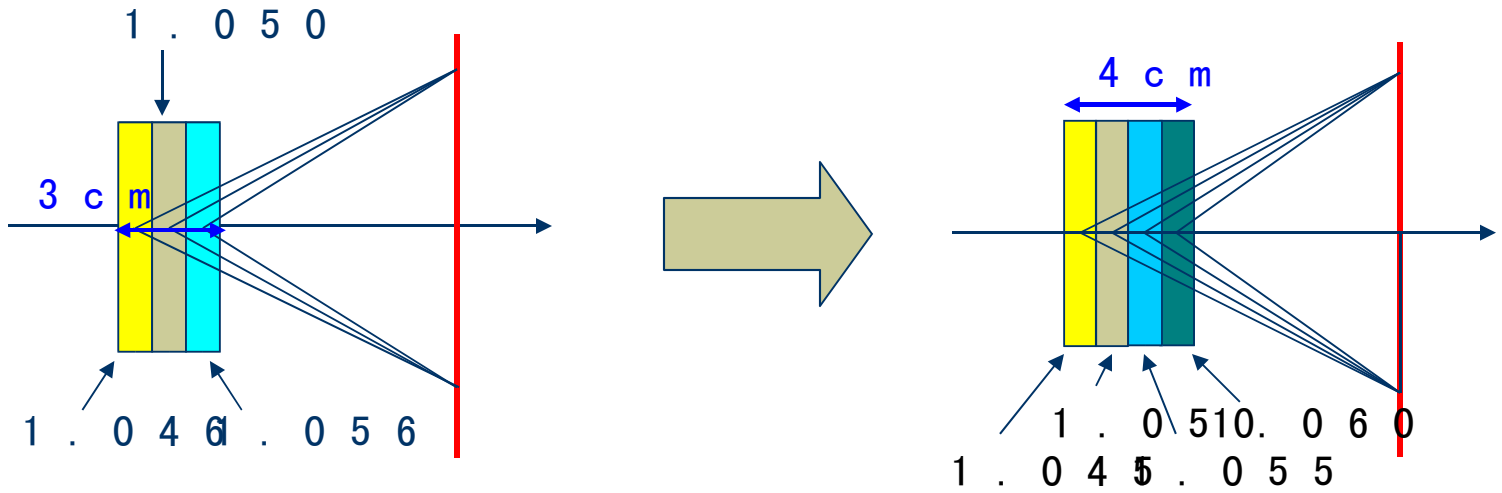
Measurement List

- New combinations of dual radiator
- Measurement of chromatic dispersion
- Aerogel-PMT distance scanning
- Small scattering on Aerogel surface
- Boundary effect

New dual radiator (Focusing type)

- Focusing dual radiator → Combine 4 kind of Aerogels

Index ex. 1.045(1cm) + 1.050(1cm) + 1.055(1cm) +1.060(1cm)



	Triple radiator	n = 1.1cm	0n4=61.2cm	n = 1.046 n = 1.056	2cm 2cm
σθ(1光子)	2.5mrad	1.7mrad	3.7mrad	4.6mrad	～13mrad
Npe	6.9	3.9	6.4	9.3	～9?

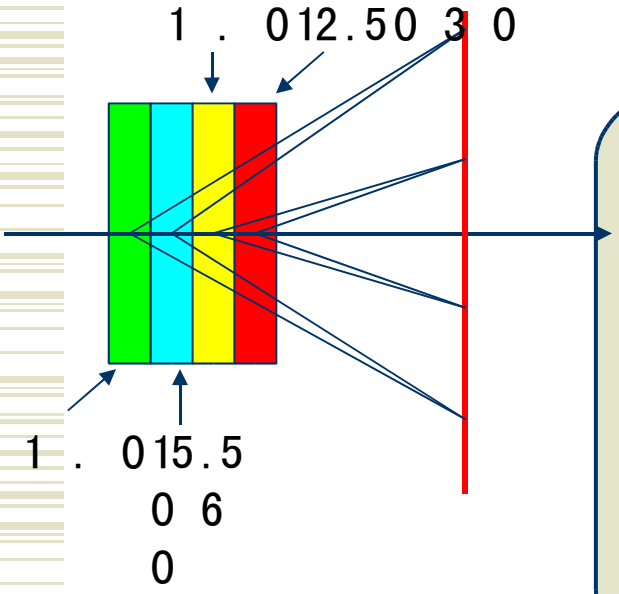
New dual radiator (Defocusing type)

- Defocusing dual radiator

Index ex. 1.025(1cm) + 1.030(1cm) & 1.055(1cm) +1.060(1cm)

Focusing Focusing

Defocusing



In Focusing dual radiator

⇨ Cherenkov angle is divided (low momentum)

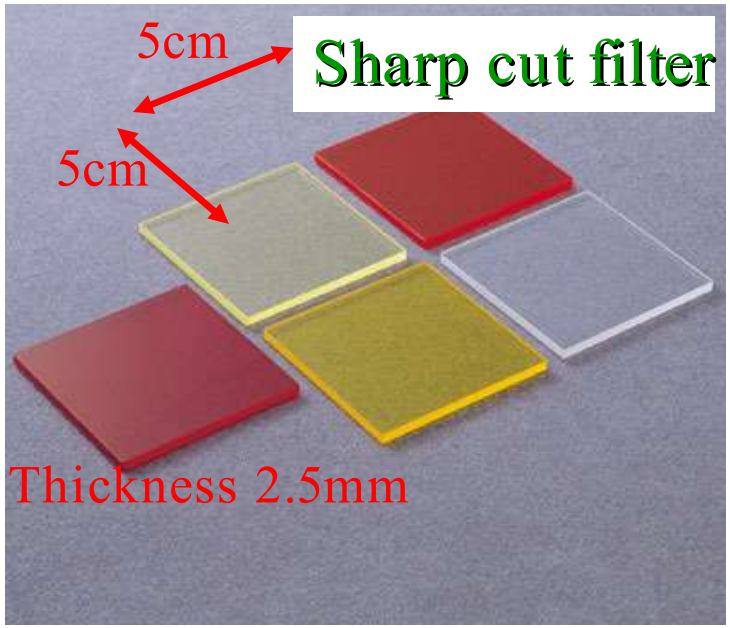
	angle 4.0Gev/c		angle 1.1Gev/c
n=1.046	0.3036 rad	⇔	0.2815 rad
Focusing	0.3021 rad	⇔	0.2826 rad

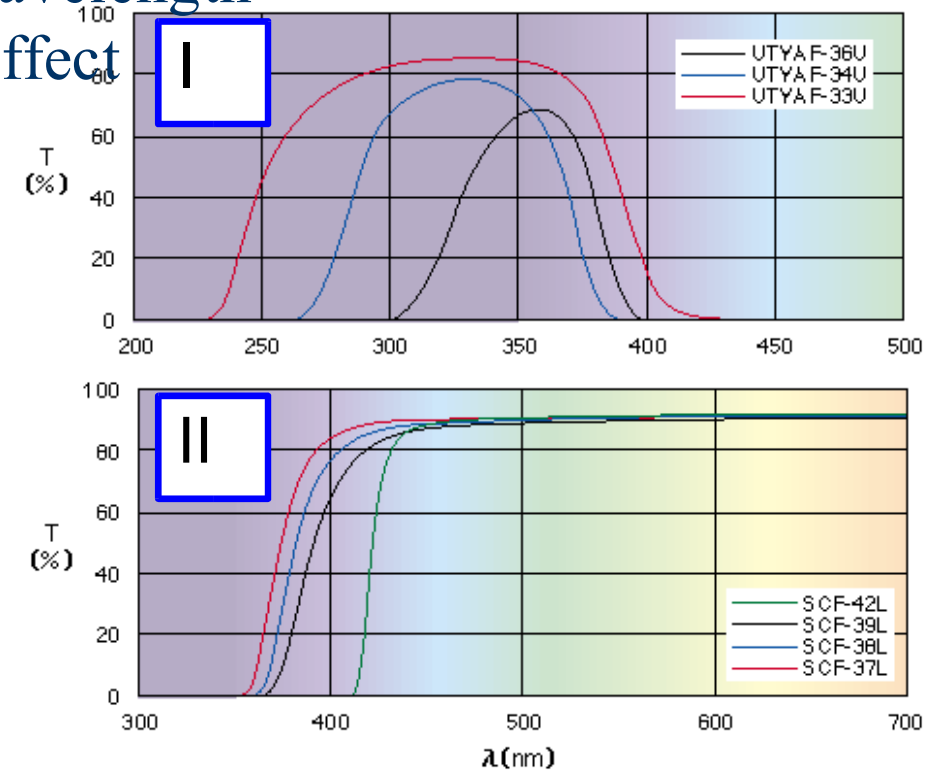
Cherenkov angle Difference is small.

⇒ Improve by Defocusing dual radiato

Chromatic dispersion

Restrict the Cherenkov photon wavelength
to test the chromatic dispersion effect



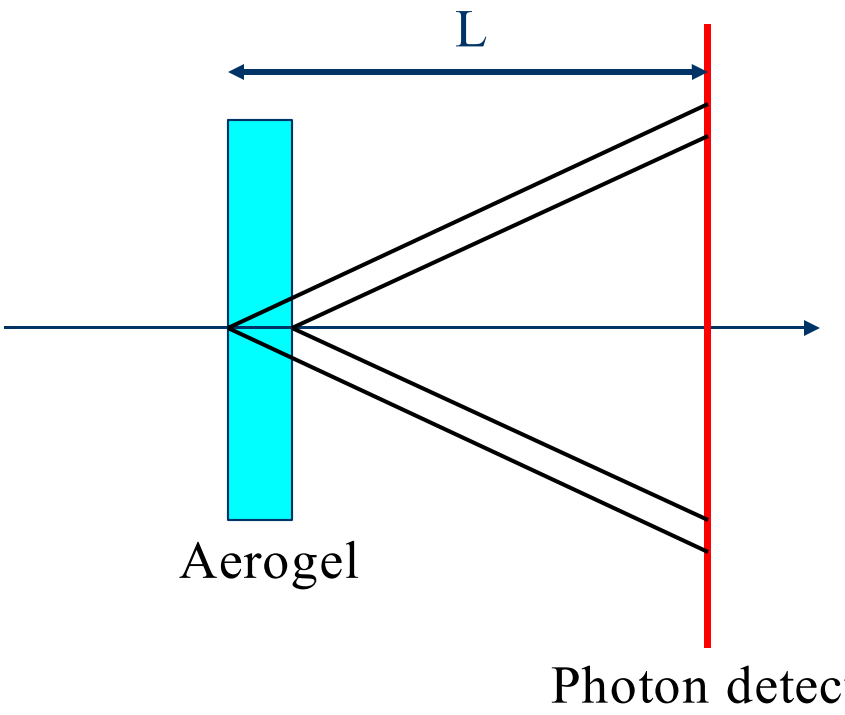


I. Bandwidth filter UTVA-F36U

II. Sharp cut filter @ 330nm,370nm,420nm,480nm,560nm

Aerogel-PMT distance scanning

- Measure the L dependence of angle resolution



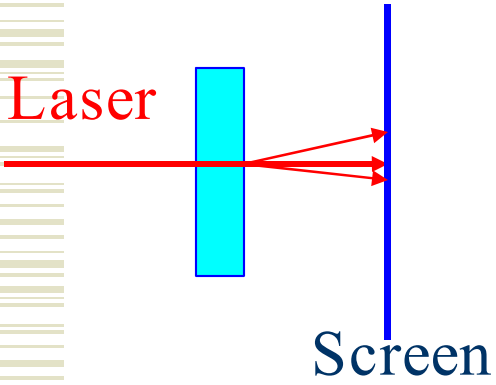
L scan

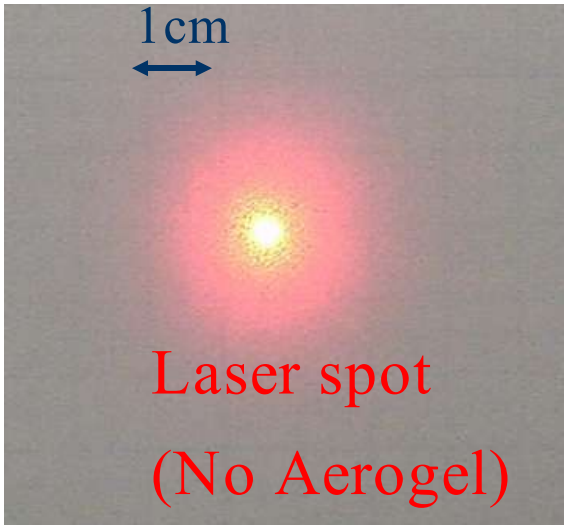
Measure Point

L=170cm,180cm,190cm,200cm

Aerogel : 1cm , 2cm

Small scattering on Aerogel surface





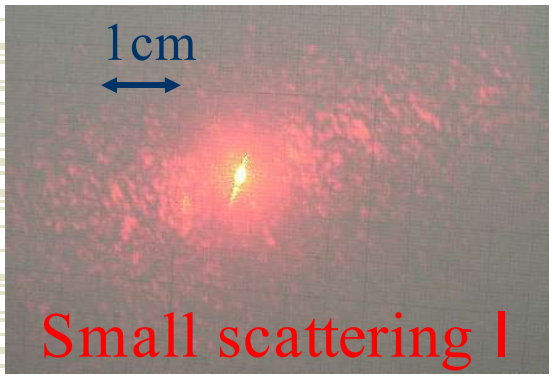
1cm Aerogel -- Two

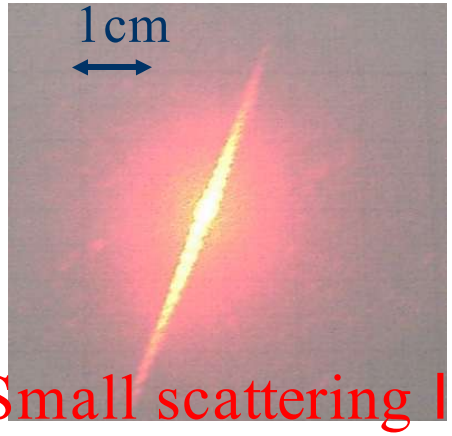
compare Angle resolution

2cm Aerogel -- One

Measure Point

n = 1.03 , 1.05 , 1.06



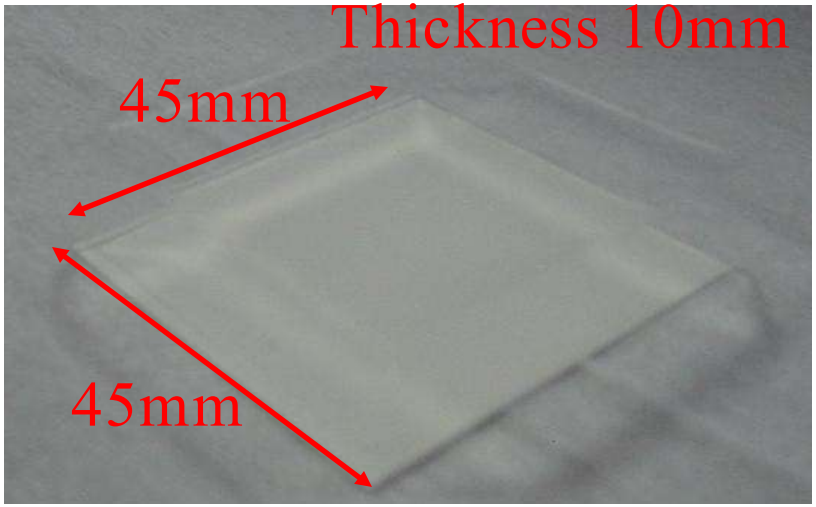


After beamtest

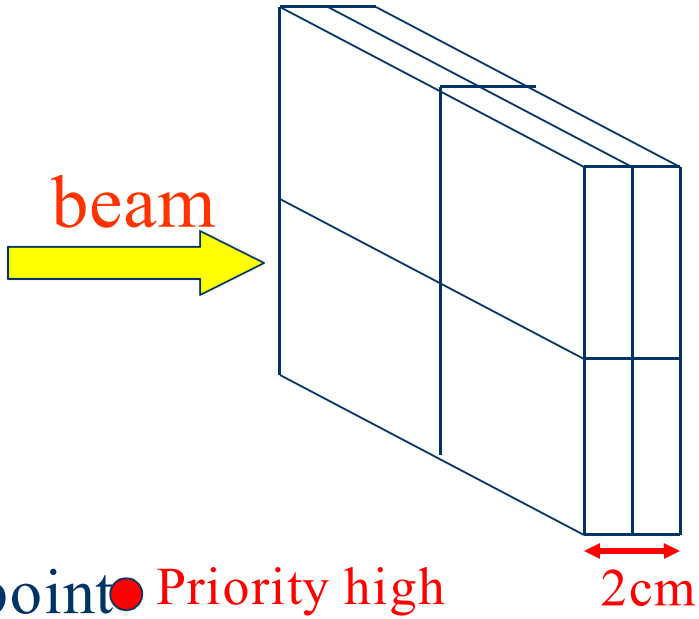
Measure the scattering by laser

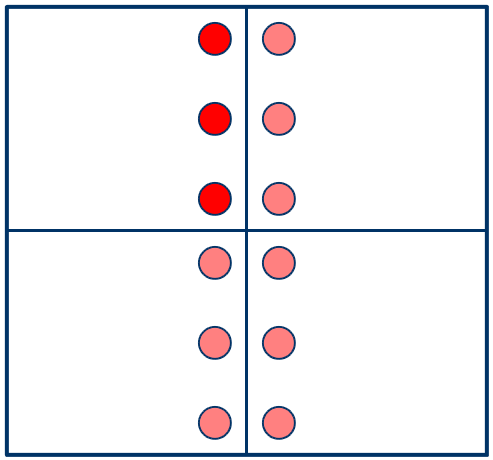
(at Nagoya)

Boundary effect



2×2 Aerogel tile





Measure point Priority high

low

Summary

Measurement item

- New combinations of dual radiator
  - Combine 4 kind of Aerogels (Focusing & Defocusing)
- Measurement of chromatic dispersion
  - Restrict the Cherenkov photon wavelength by filter
- Aerogel-PMT distance scanning
- Small scattering on Aerogel surface
  - compare Angle resolution (1cm×two & 2cm×one)
- Boundary effect

The success or failure of new Aerogels are important