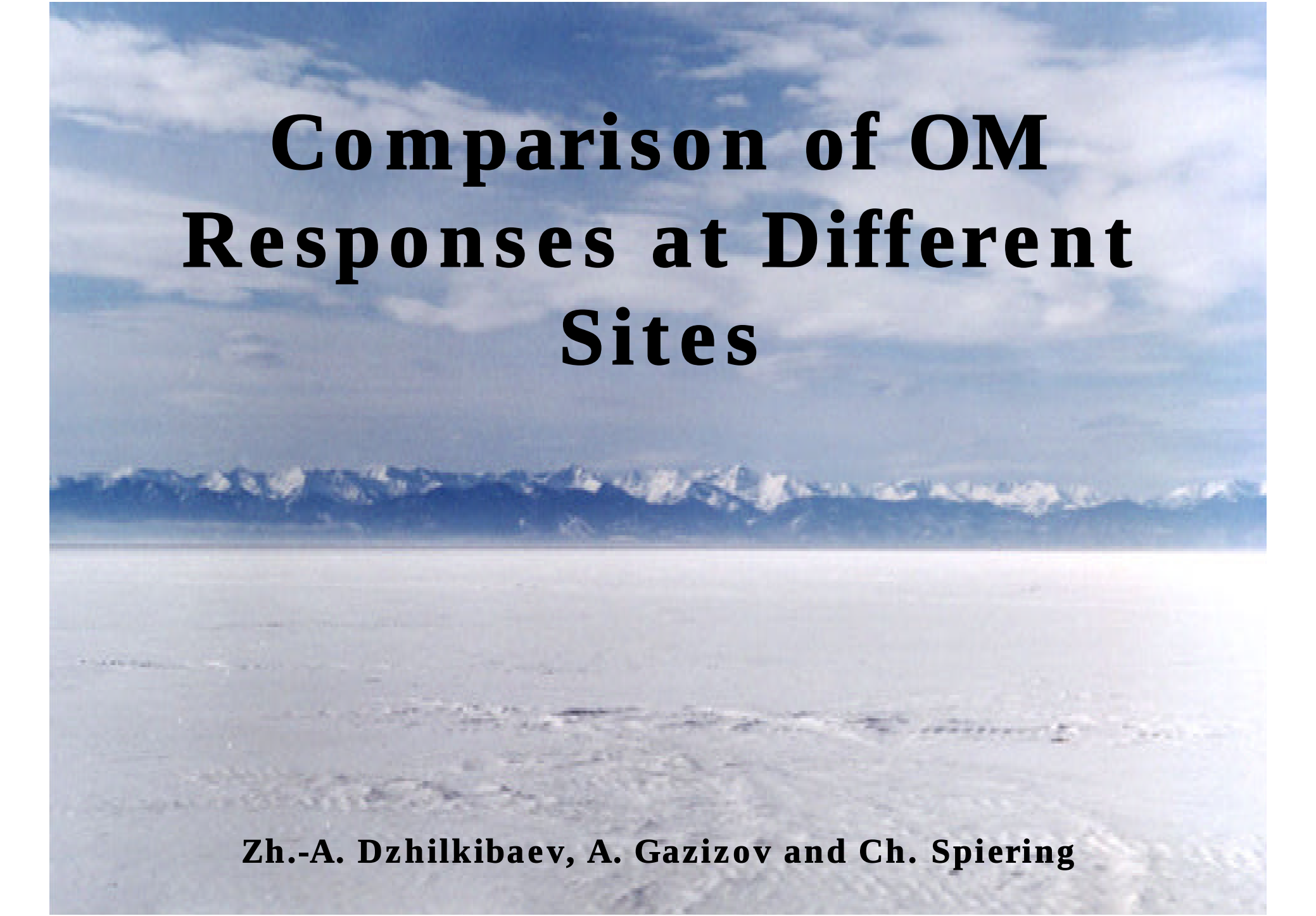




# **Comparison of OM Responses at Different Sites**

**Zh.-A. Dzhilkibaev, A. Gazizov and Ch. Spiering**

# Response of OM to Muon Tracks

Uniform track

$$N_{\gamma} = N_{\mu} + N_{\delta}$$

$N_{\mu}$  – muon's light

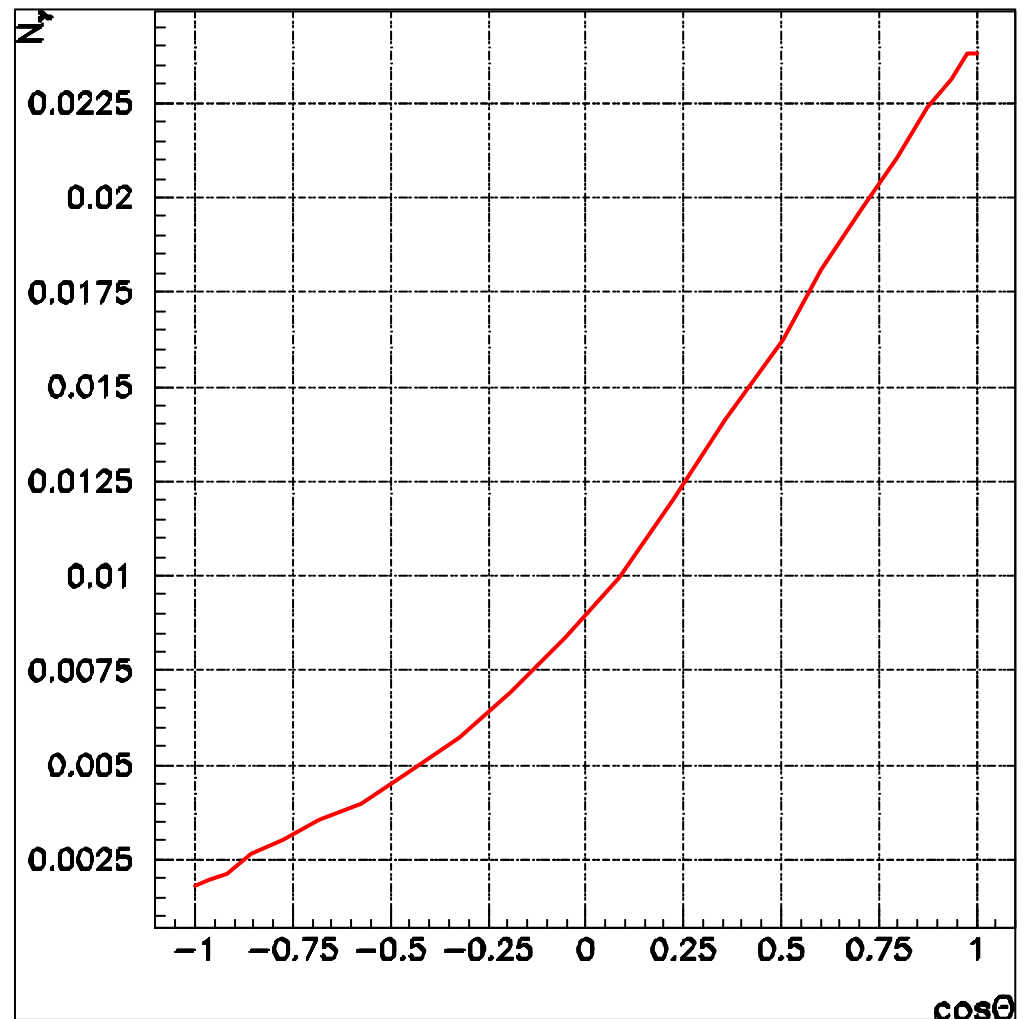
$N_{\delta}$  –  $\delta$ -el. light  
(8%  $N_{\mu}$ )

Sites

Lake Baikal (BAIKAL)

Mediterranean  
(ANTARES)

Antarctic ice  
(AMANDA)

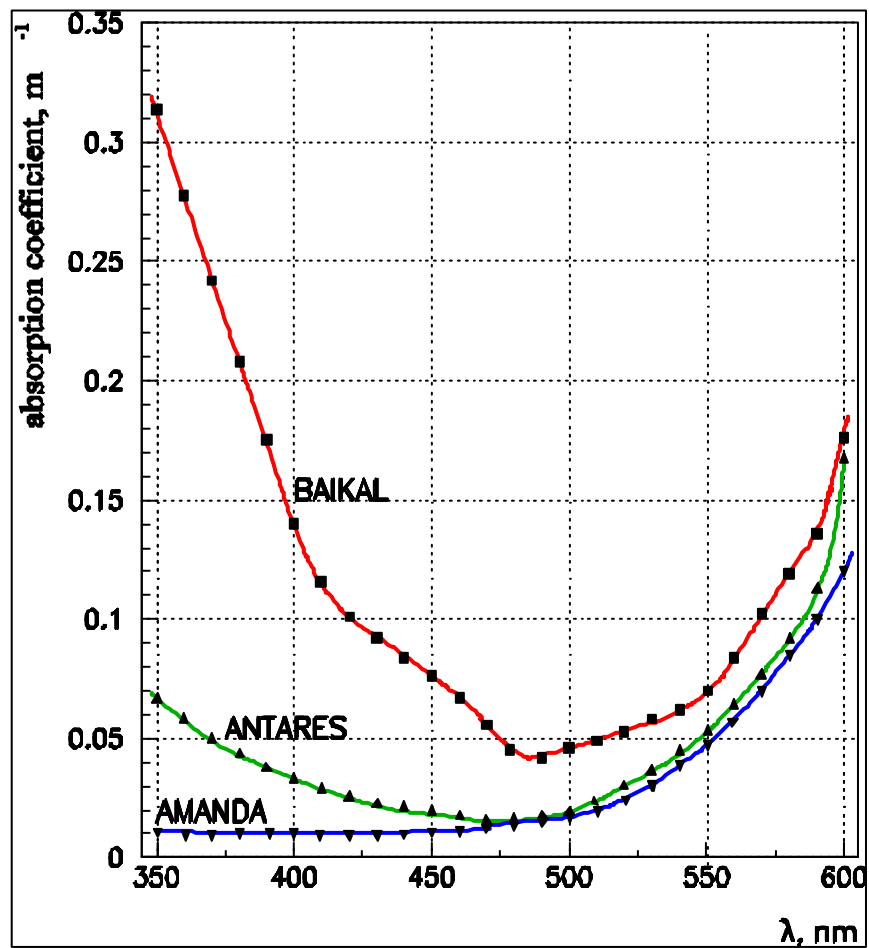


# Optical Parameters

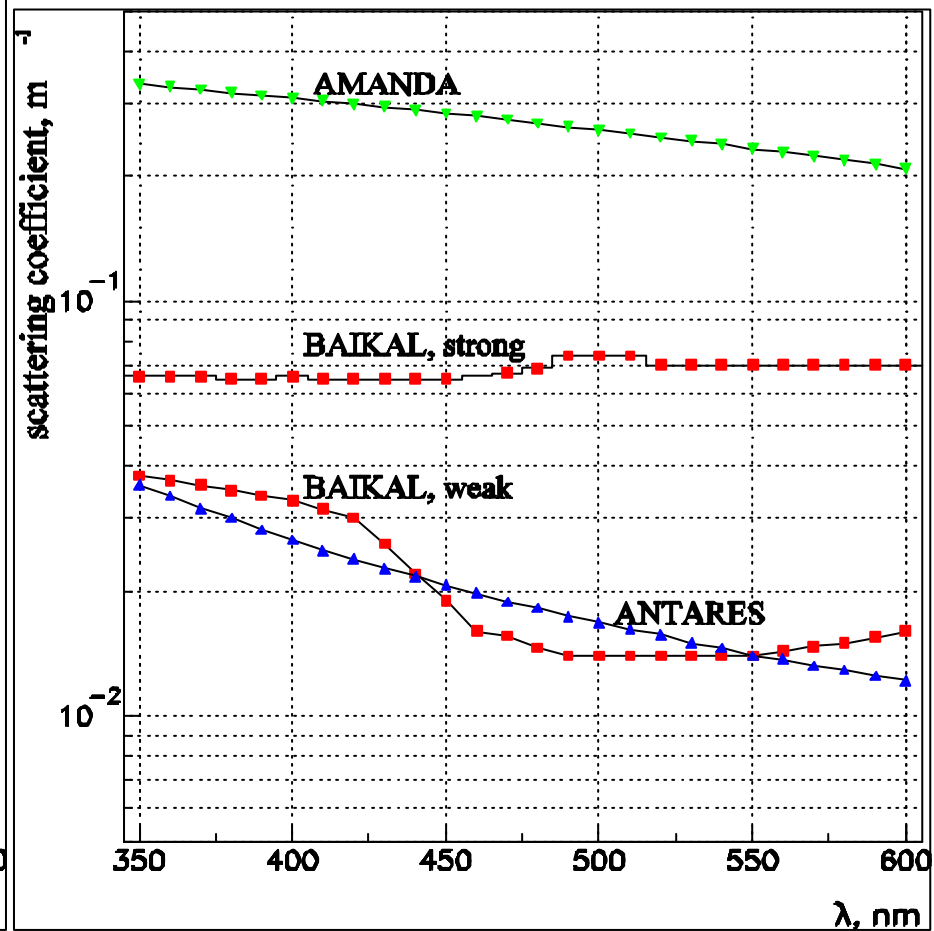
Light wave-length: 350 nm – 600 nm

|                                 |   | BAIKAL   | AMANDA    | ANTARES   |
|---------------------------------|---|----------|-----------|-----------|
| Absorption                      | - | ~20 m    | ~100 m    | ~60 m     |
| Scattering                      | - | 30–50 m  | ~3 m      | 50-70 m   |
| Scattering<br>Function          | - | 0.85-0.9 | 0.9-0.95  | ~0.85     |
| Inverse light<br>velocity, ns/m | - | 4.68-4.5 | 4.59-4.44 | 4.73-4.55 |

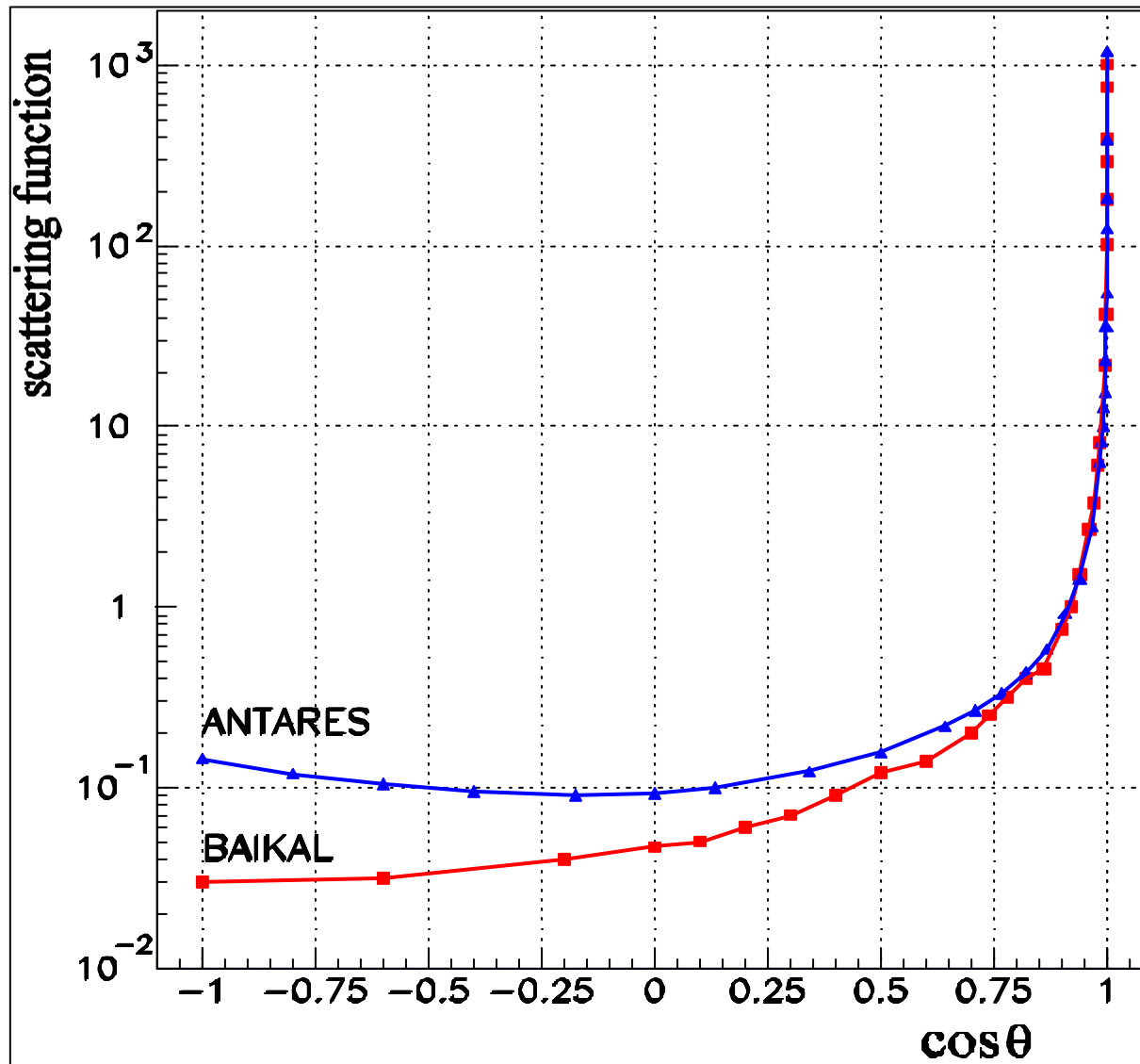
absorption



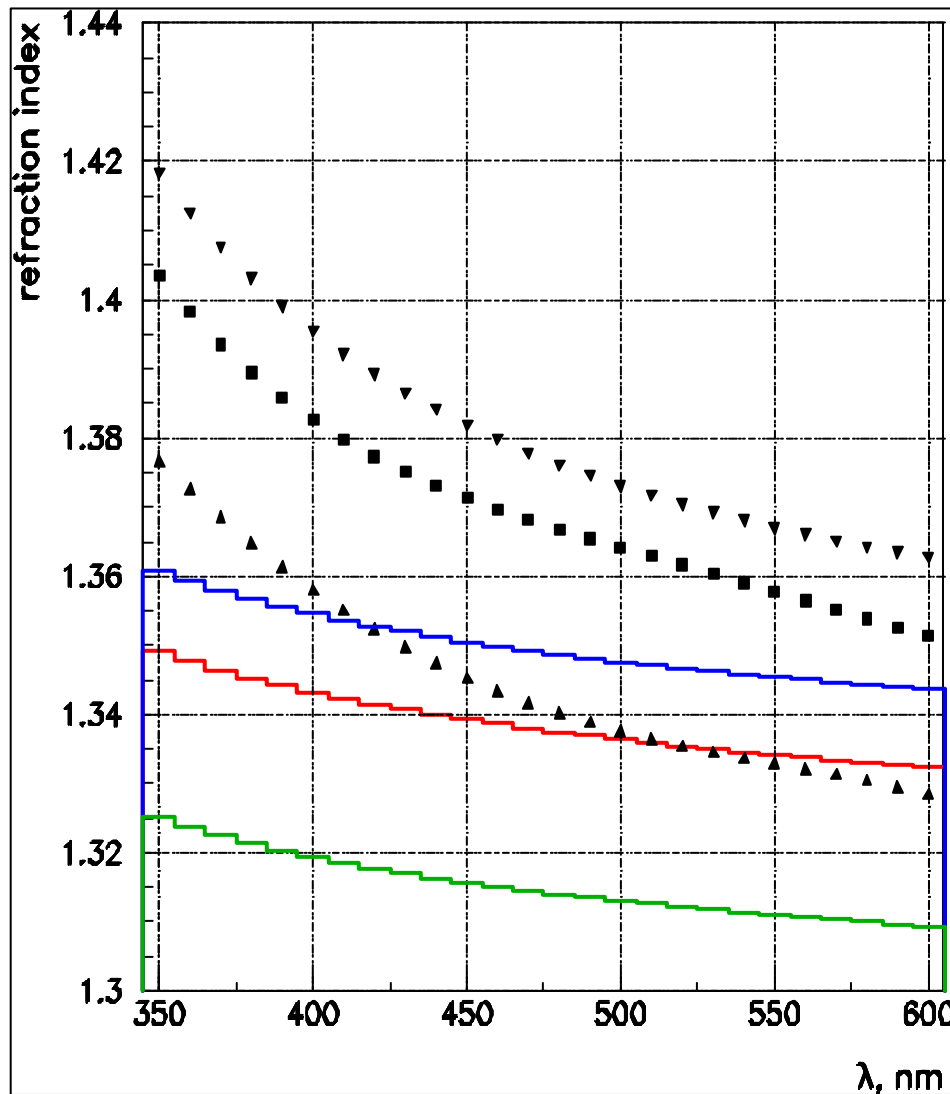
scattering



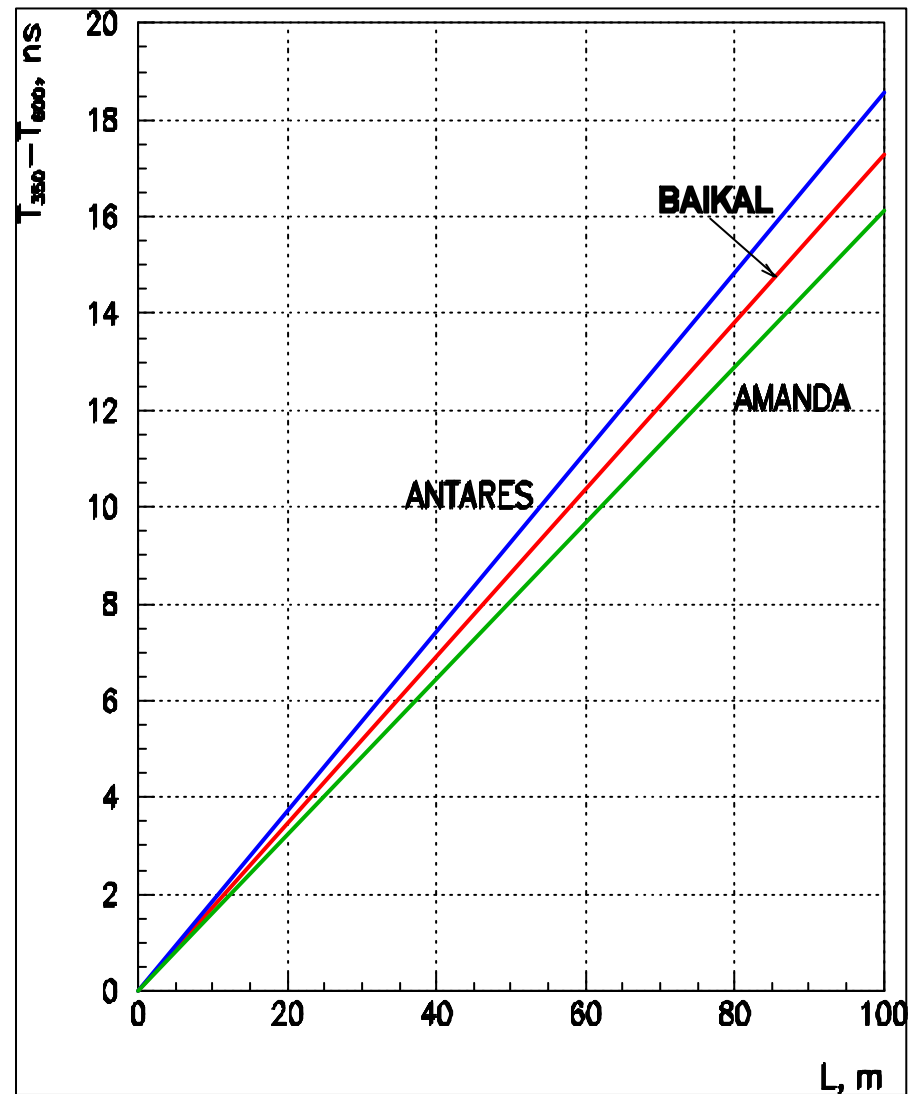
# scattering function



## Refraction index

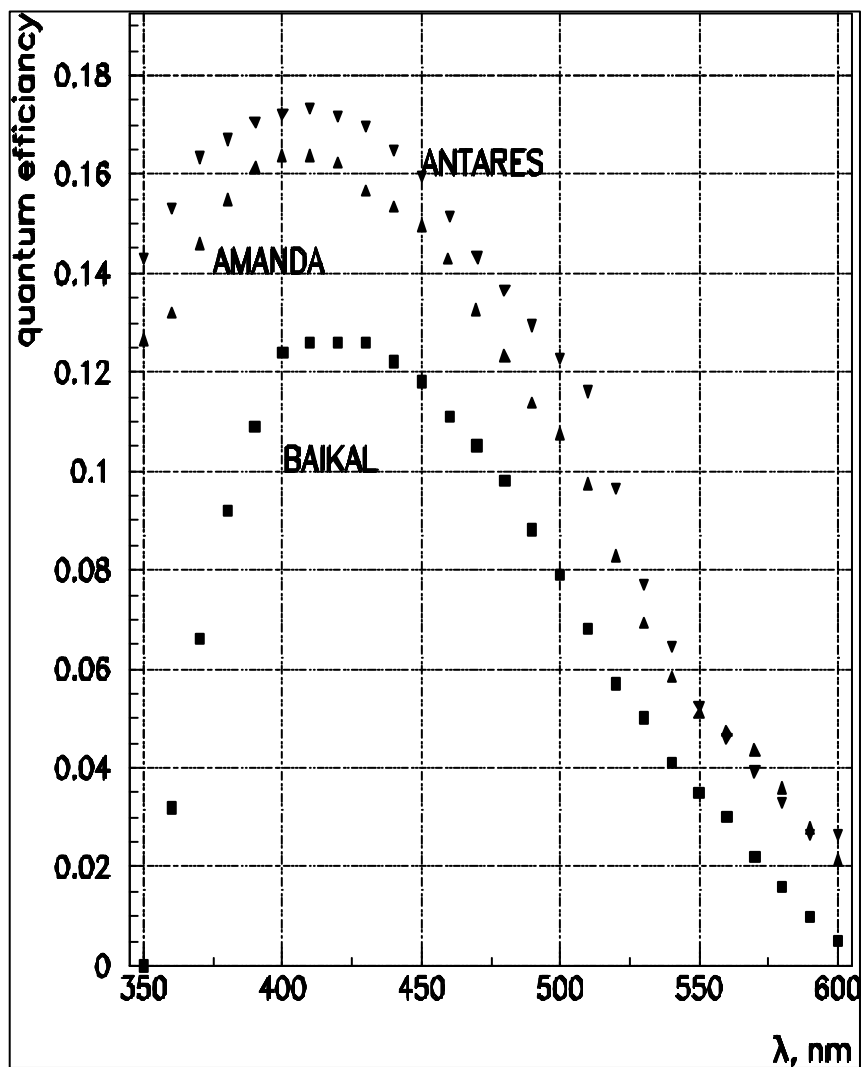


## Time differences (350 nm – 600 nm)

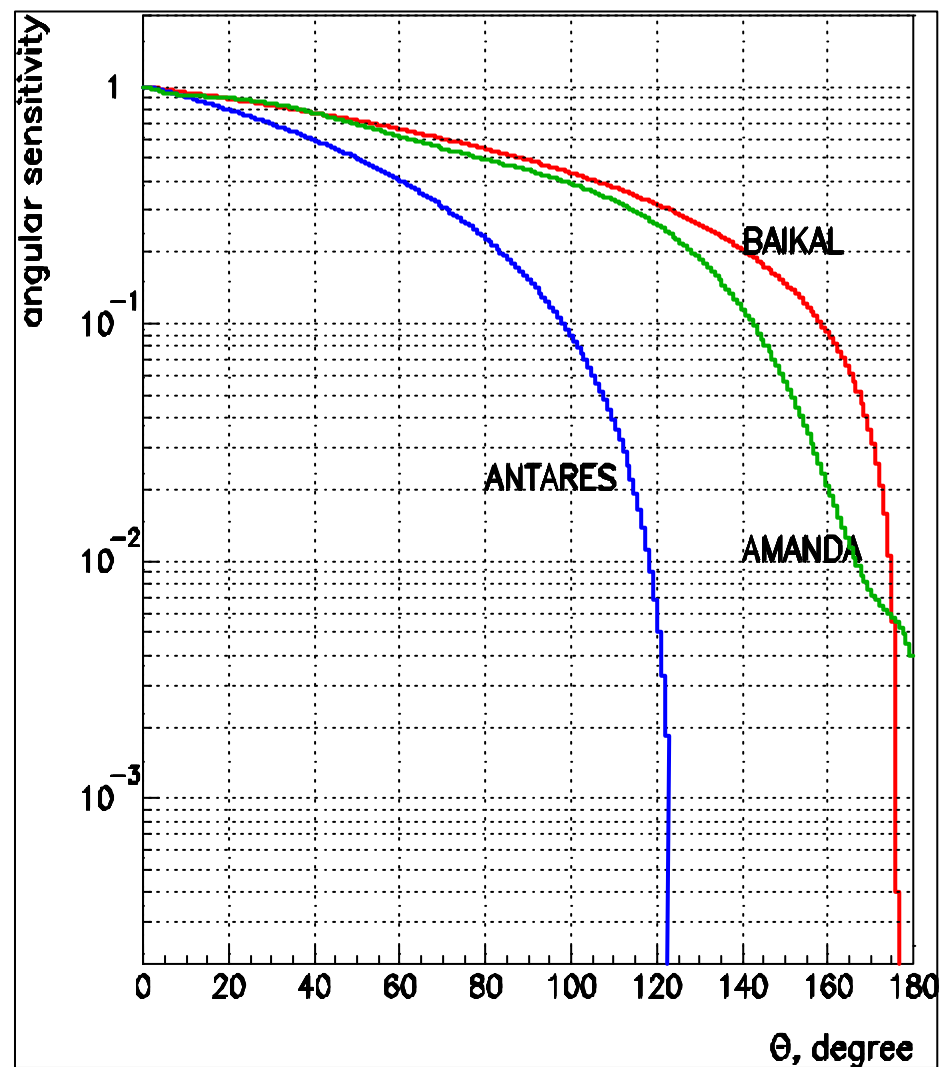


# Characteristics of OM

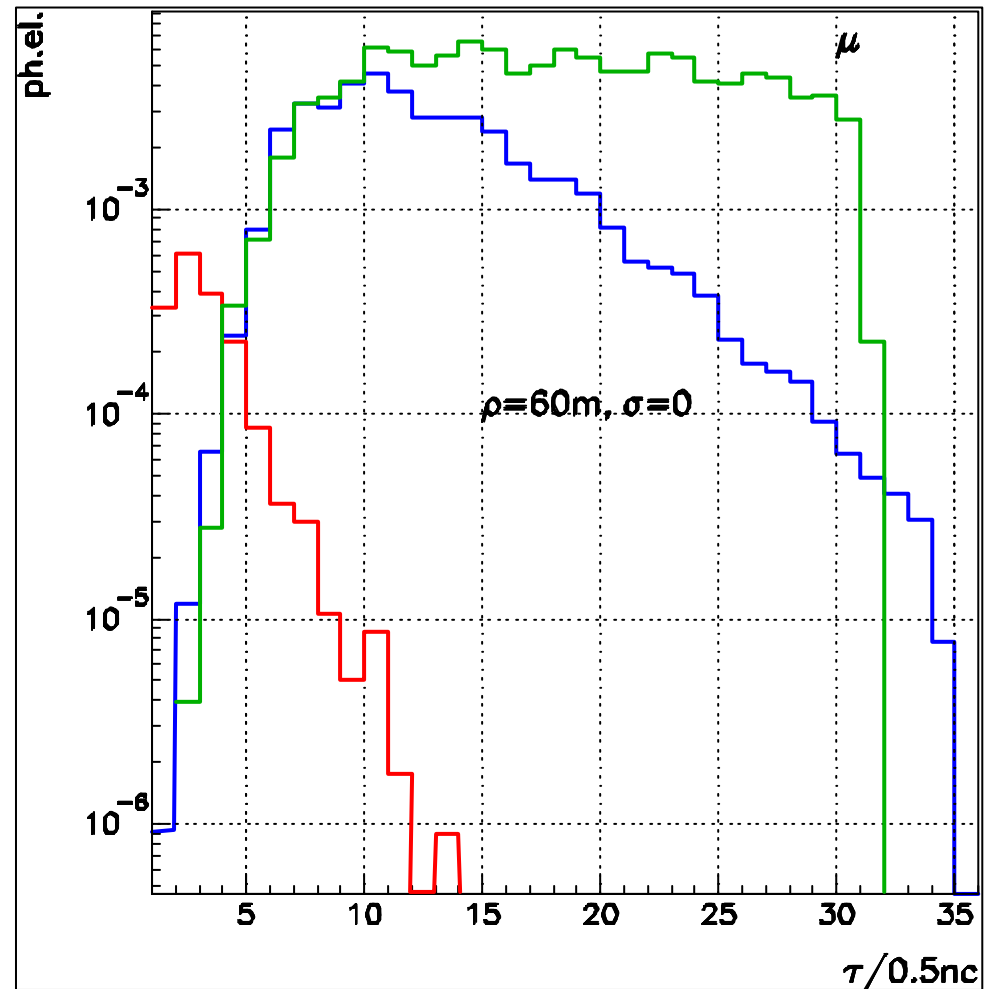
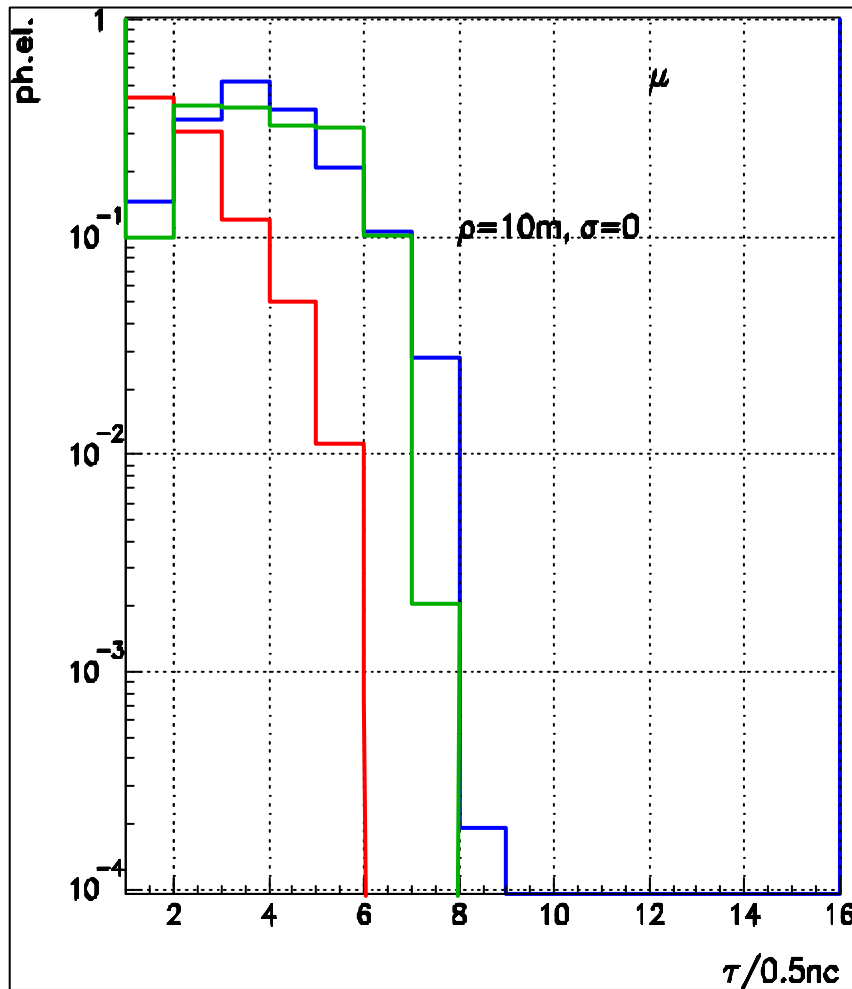
quantum efficiency



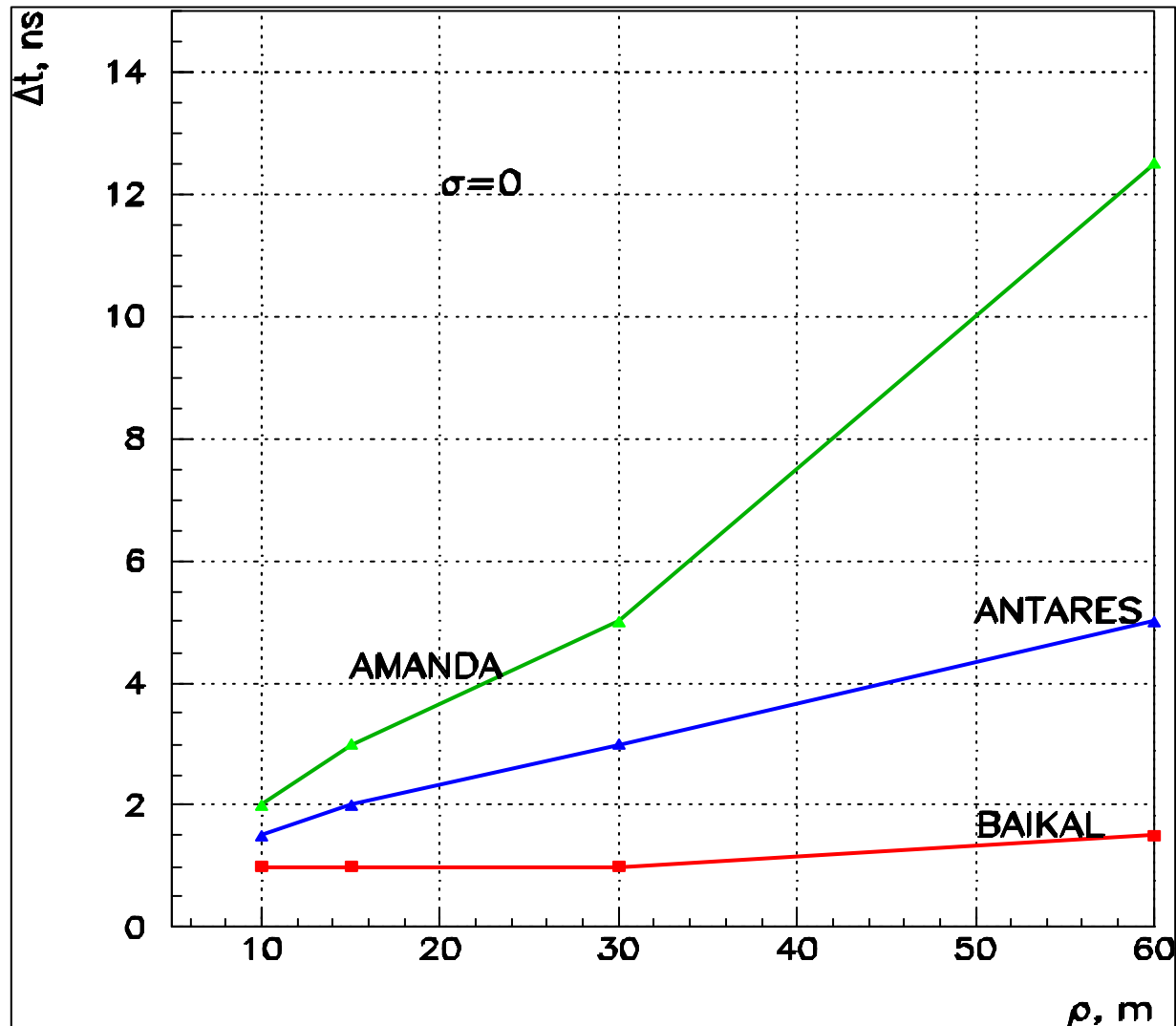
angular sensitivity



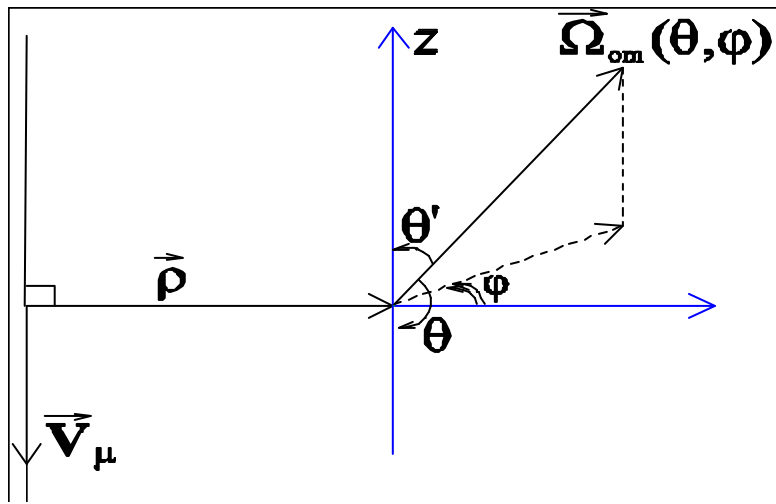
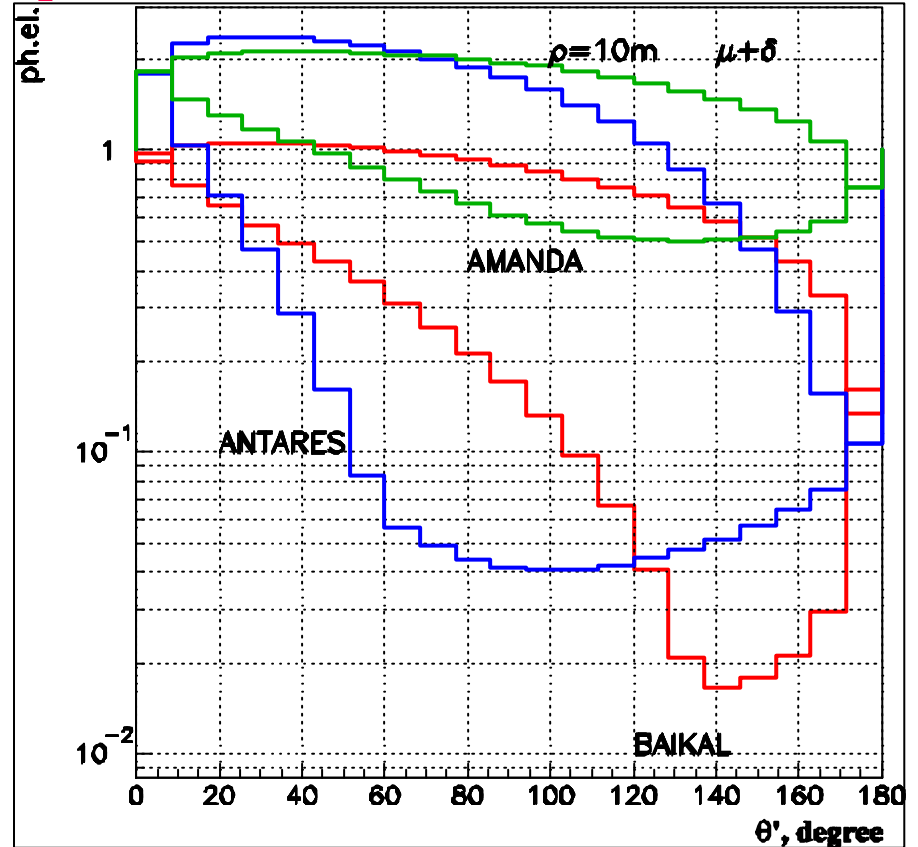
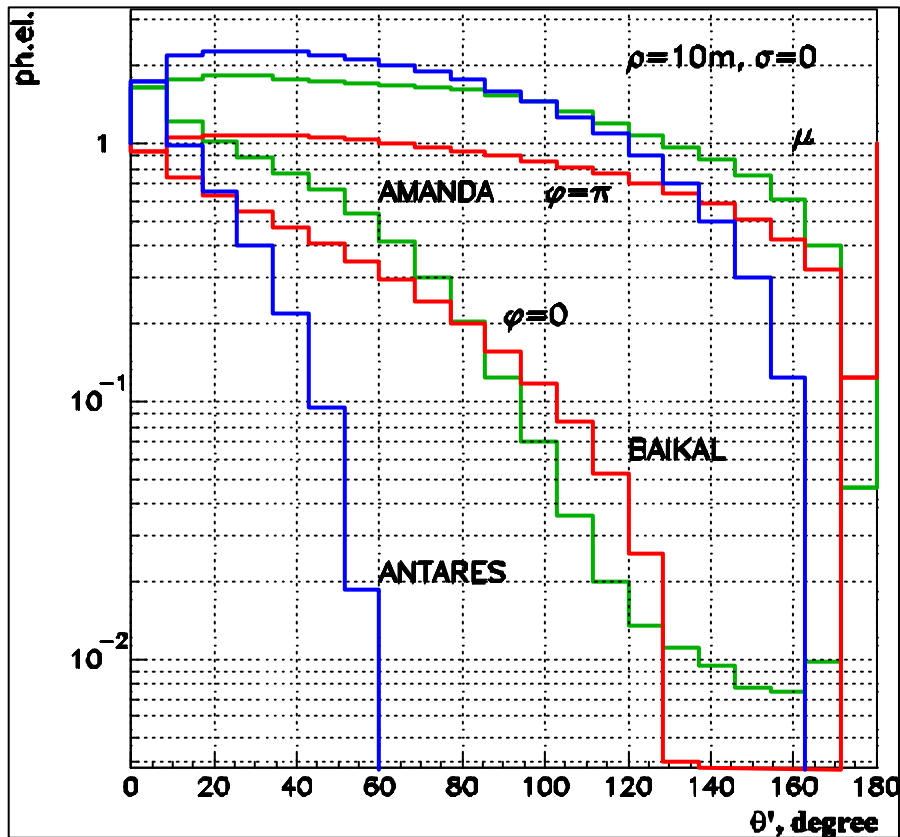
# Influence of light velocity and absorption on OM time response (without scattering)



# FWHM of the time distribution (without scattering)

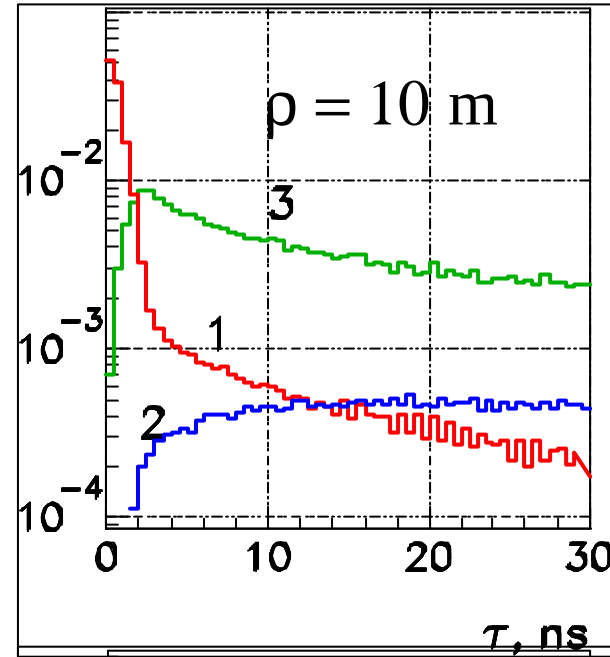
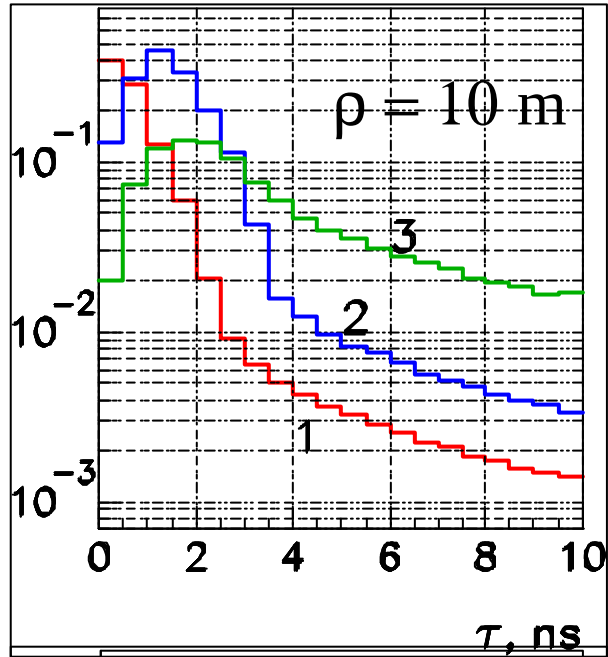


# Dependence of OM response on its orientation



|         | anisotropy | Blind zone |
|---------|------------|------------|
| BAIKAL  | $\sim 50$  | 4 %        |
| ANTARES | $\sim 50$  | 25 %       |
| AMANDA  | $\sim 4$   | -          |

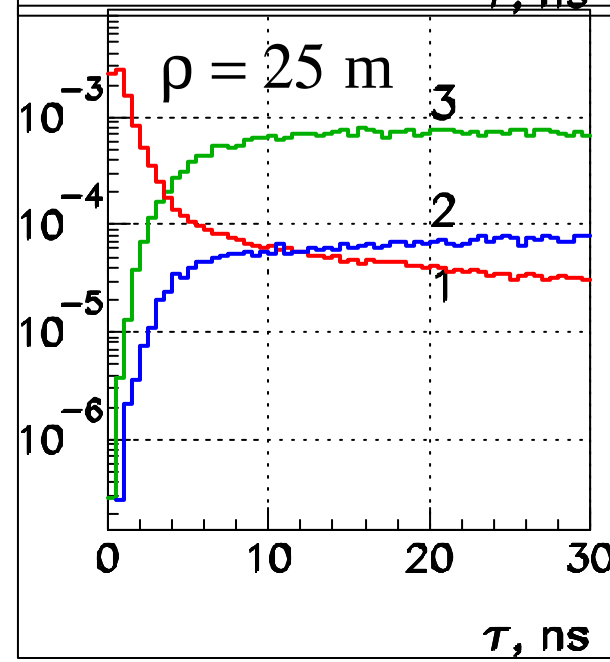
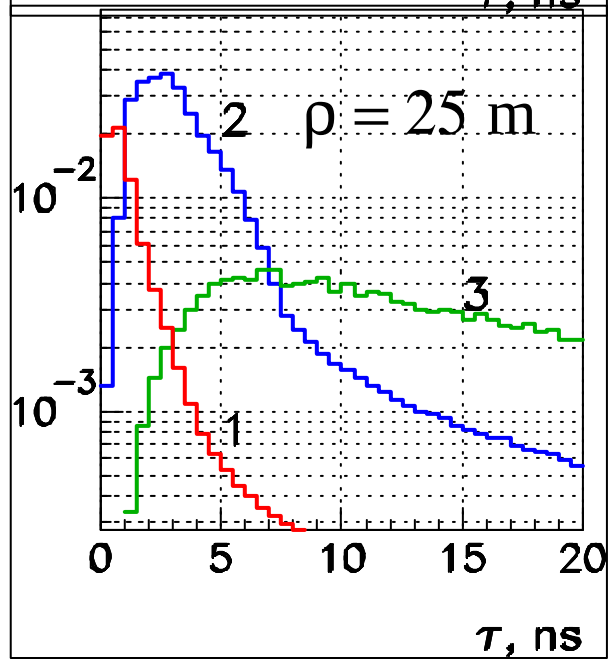
# Time distributions



BAIKAL

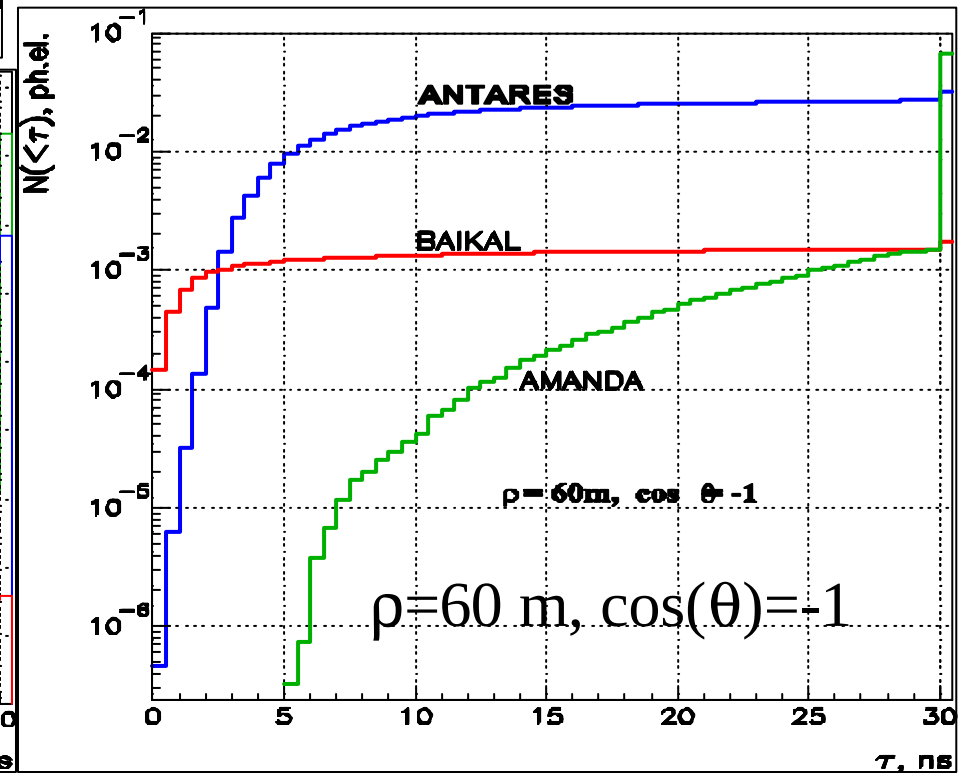
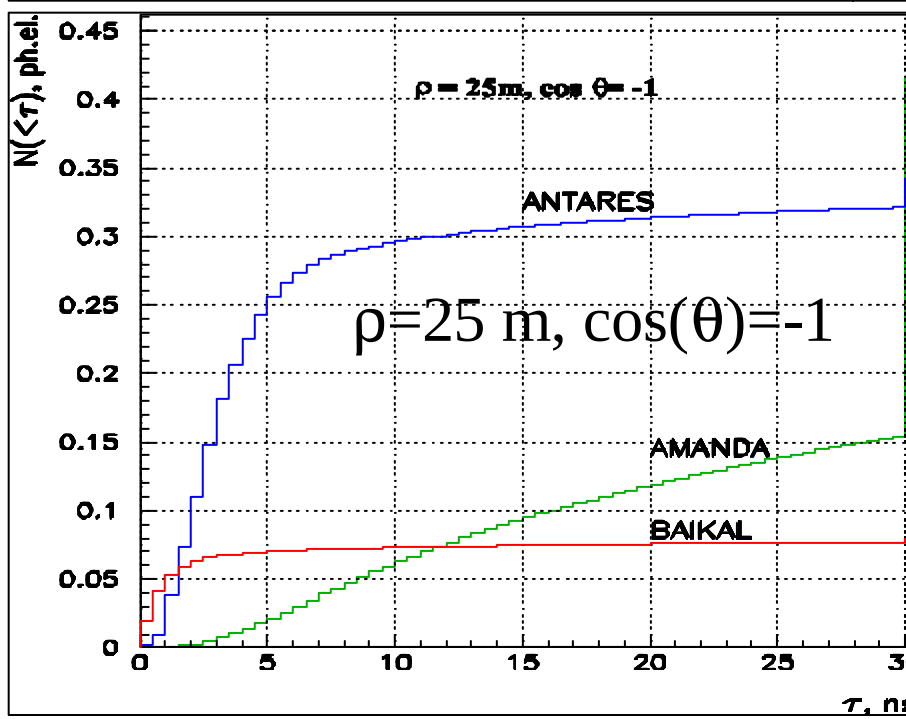
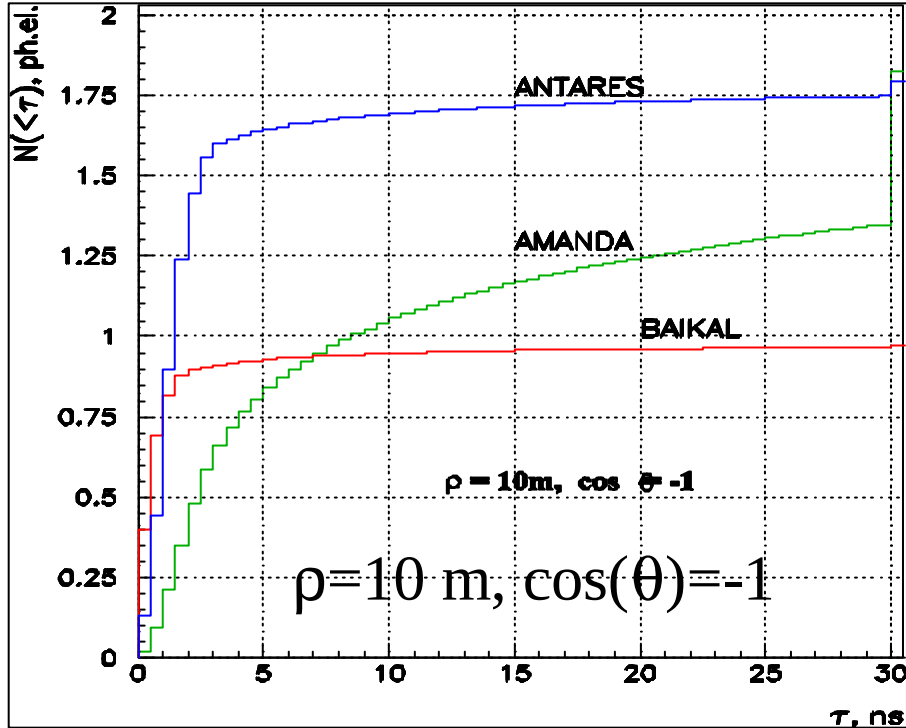
AMANDA

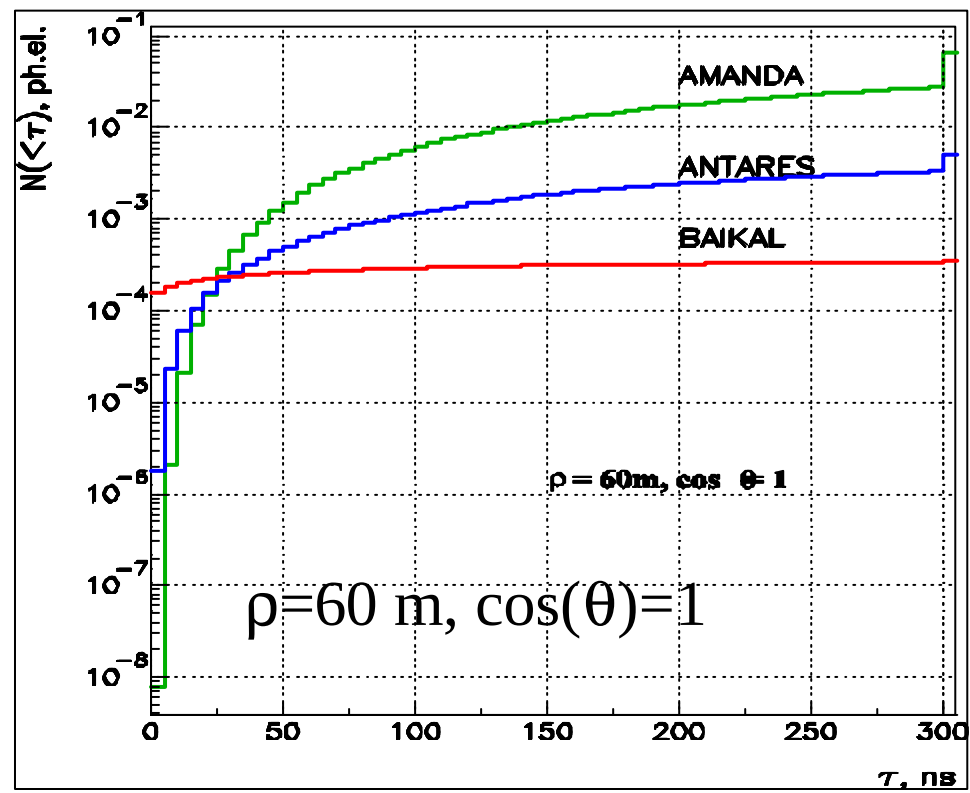
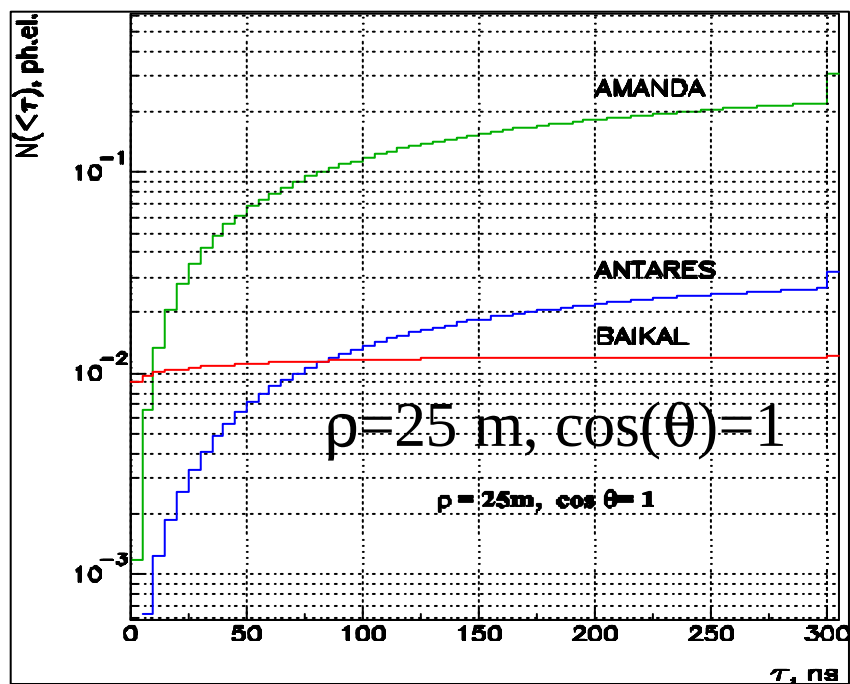
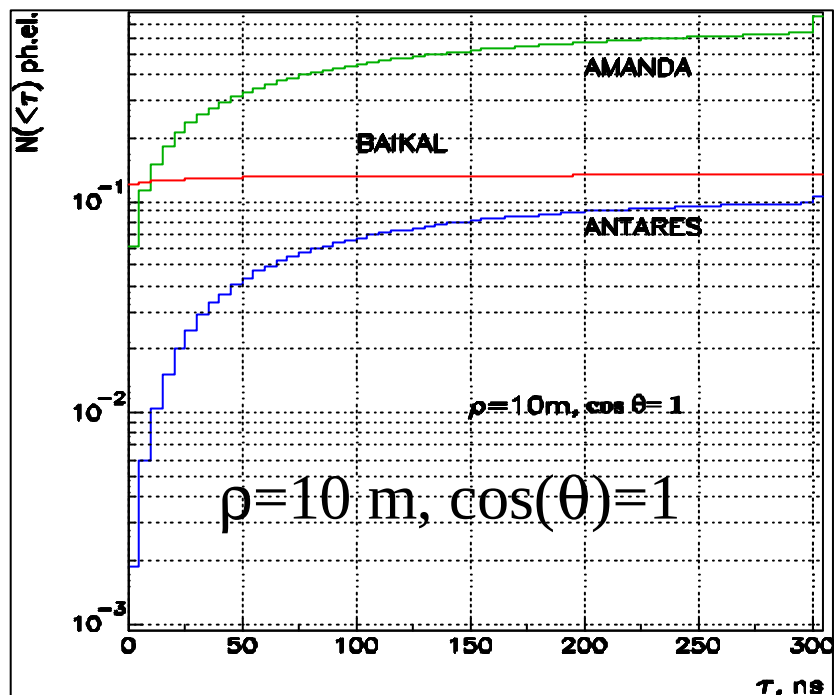
ANTARES



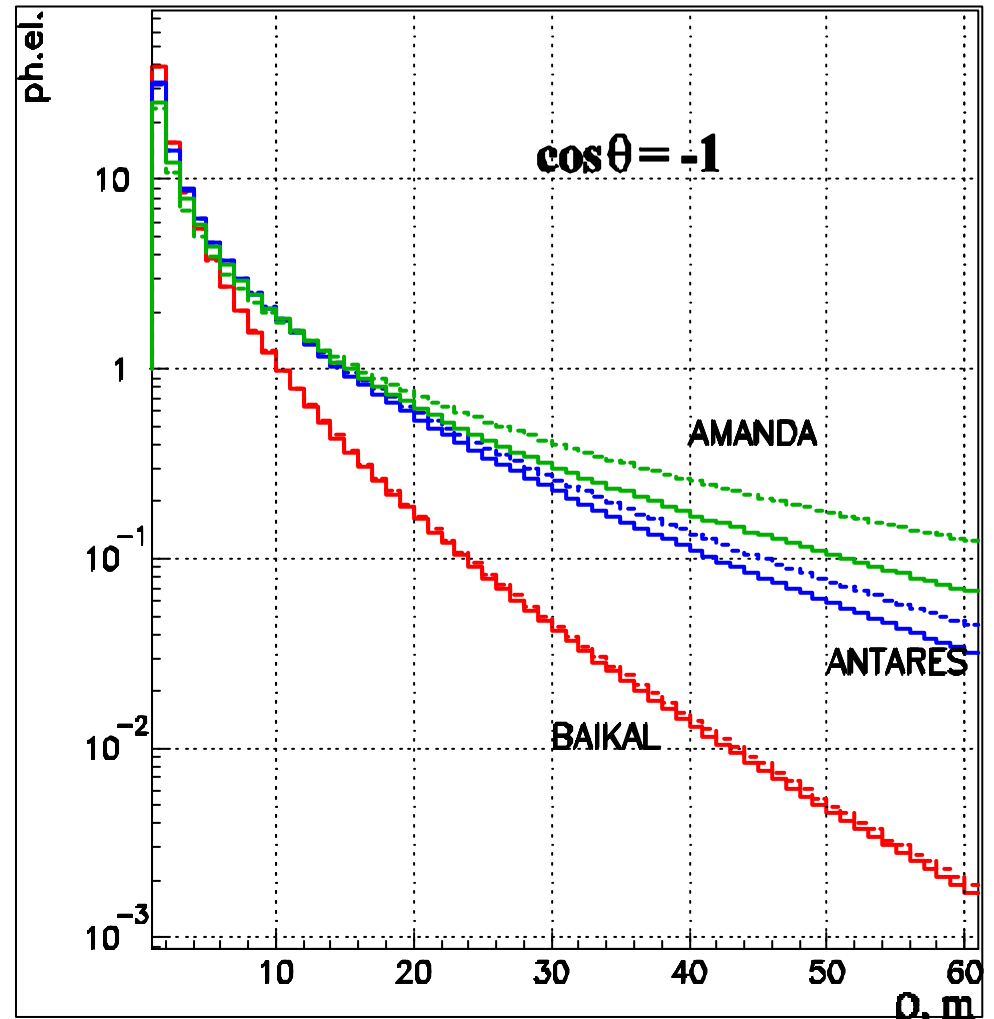
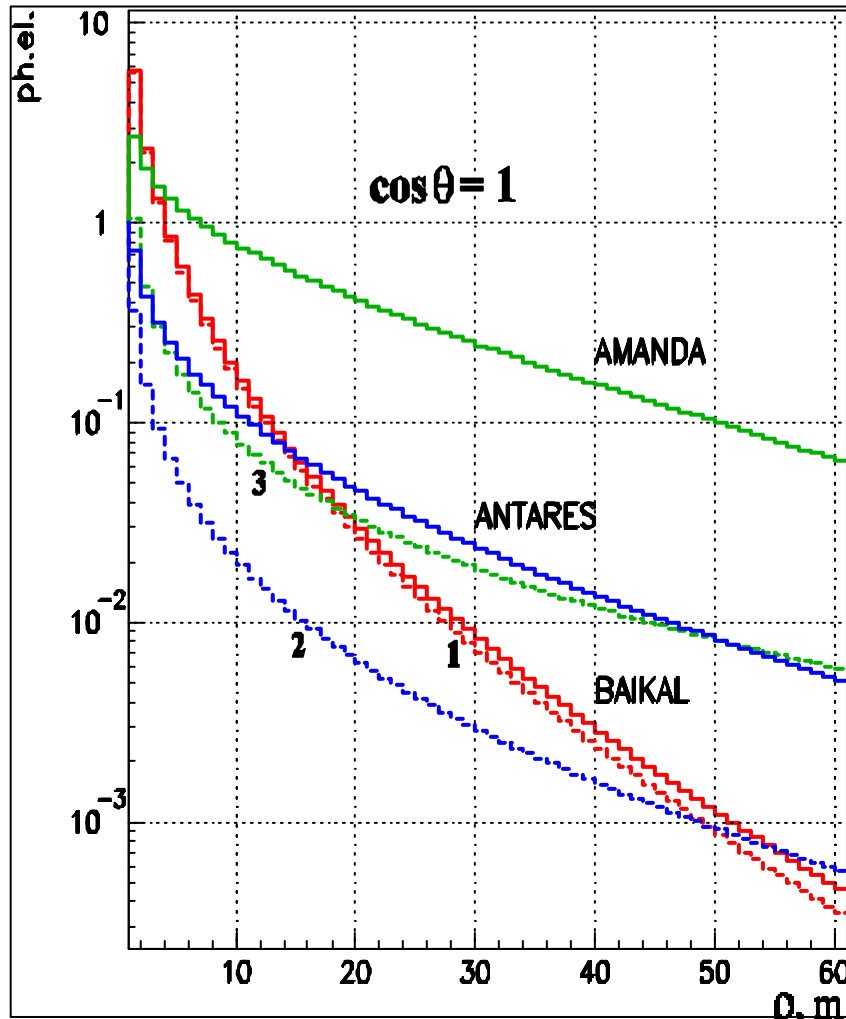
# Integral time distributions

$$N(<\tau)$$





# Number of photoelectrons as a function of distance



# SUMMARY

|         | R<br>1pe | R <sub>s</sub> | $\vec{\Omega}$         | <i>dt, ns</i>    |
|---------|----------|----------------|------------------------|------------------|
| BAIKAL  | ~10m     | ~20m           | anisot.<br>4%, blind   | ~2<br>(4% ~20)   |
| AMANDA  | ~15m     | 55m            | isotrop.               | 1-100            |
| ANTARES | ~15m     | 40m            | anisotr.<br>25%, blind | 1-5<br>(25% ~50) |