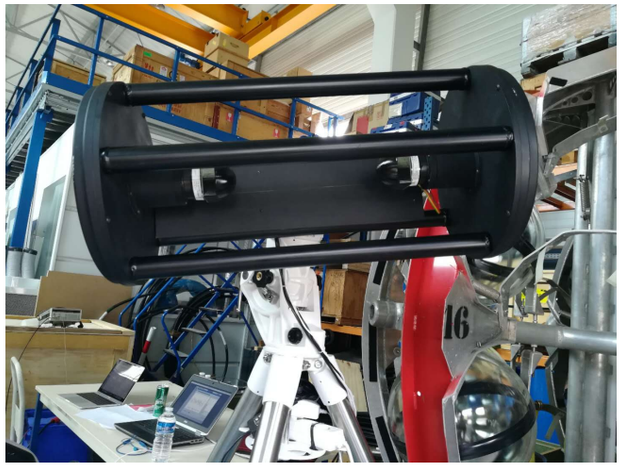
Muon Telescope

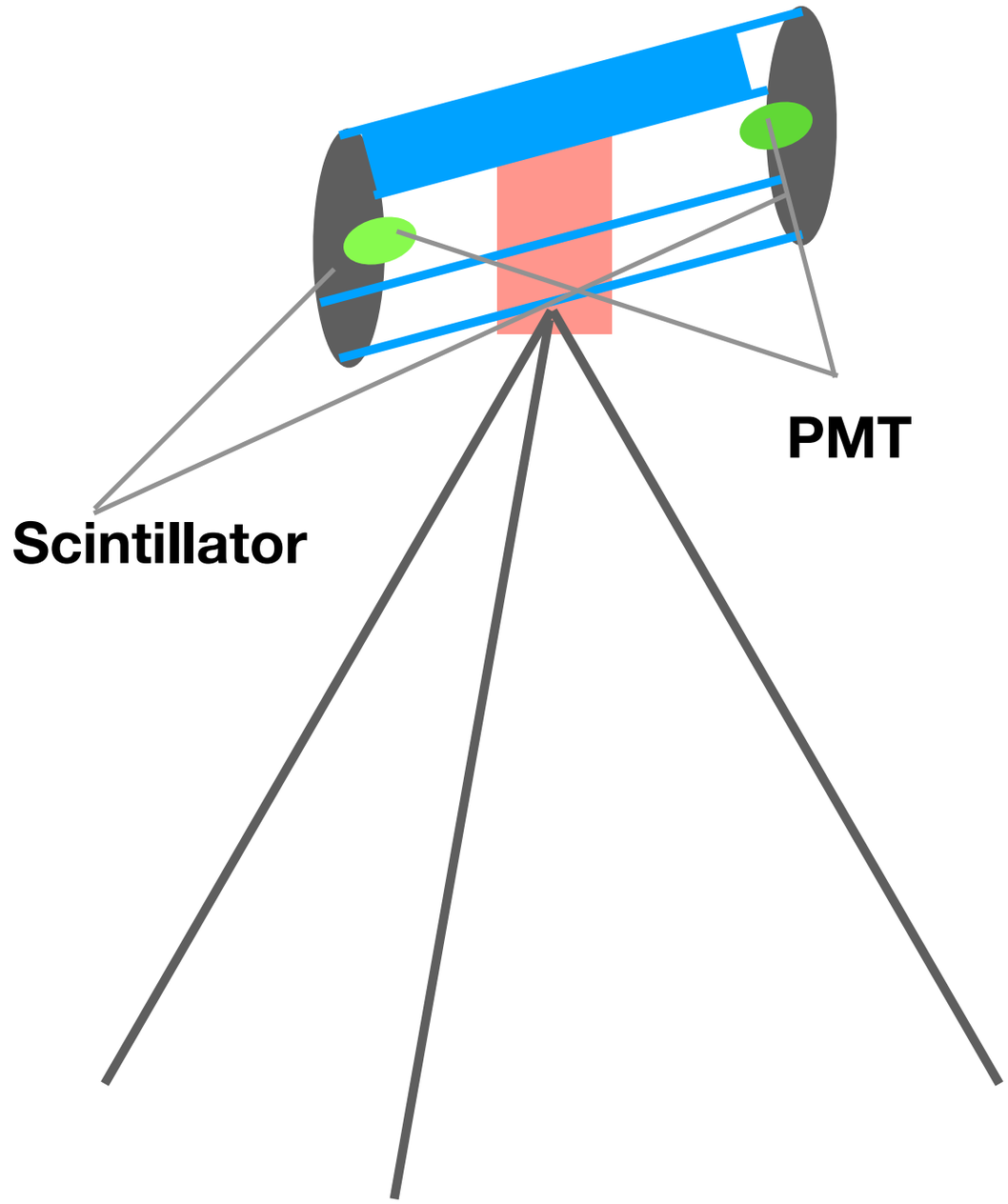
SU Shixiang, ZHENG Xiangxuan

Outline

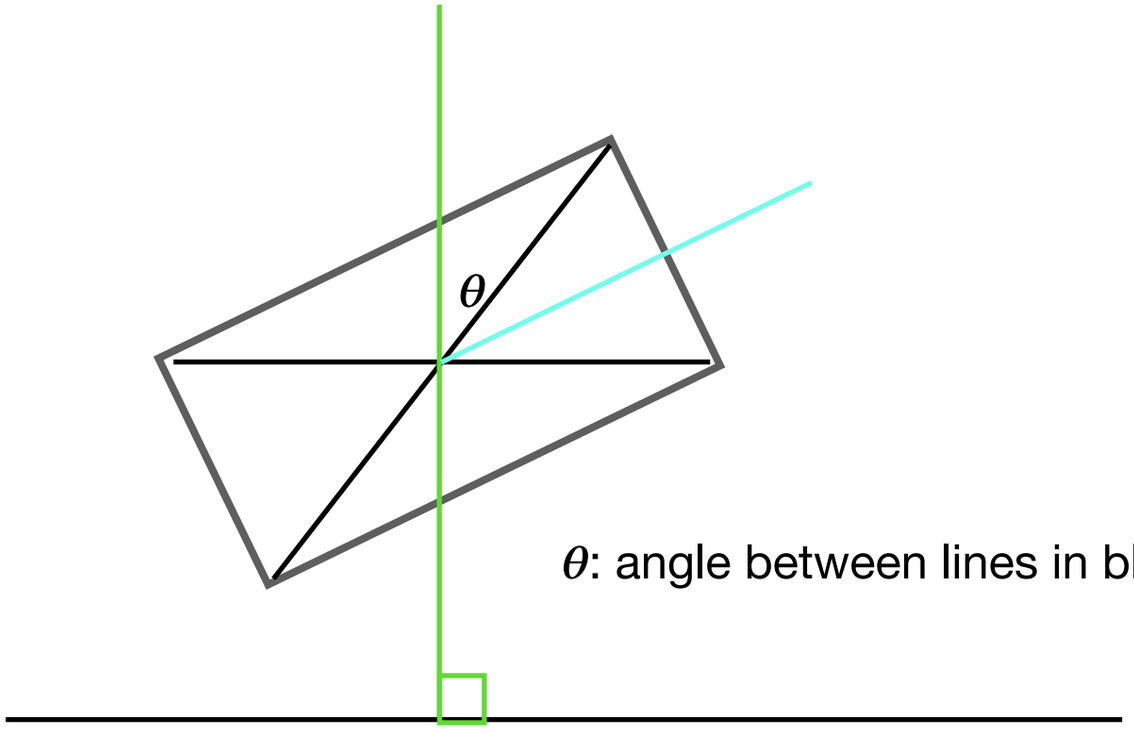
- ❖Instrument
- ❖Atmosphere Muon Flux
- ❖Rate-Angle
- ❖Scan Sky
- ❖Conclusion

Instrument





Length: 60 cm
Radius: 30 cm



θ: angle between lines in blue and green

Atmosphere Muon Flux

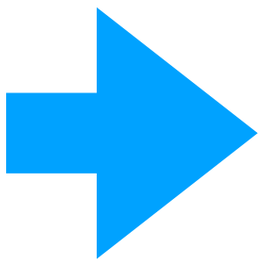
Count: 166

Time:120s

Rate: 1.383 s^{-1}

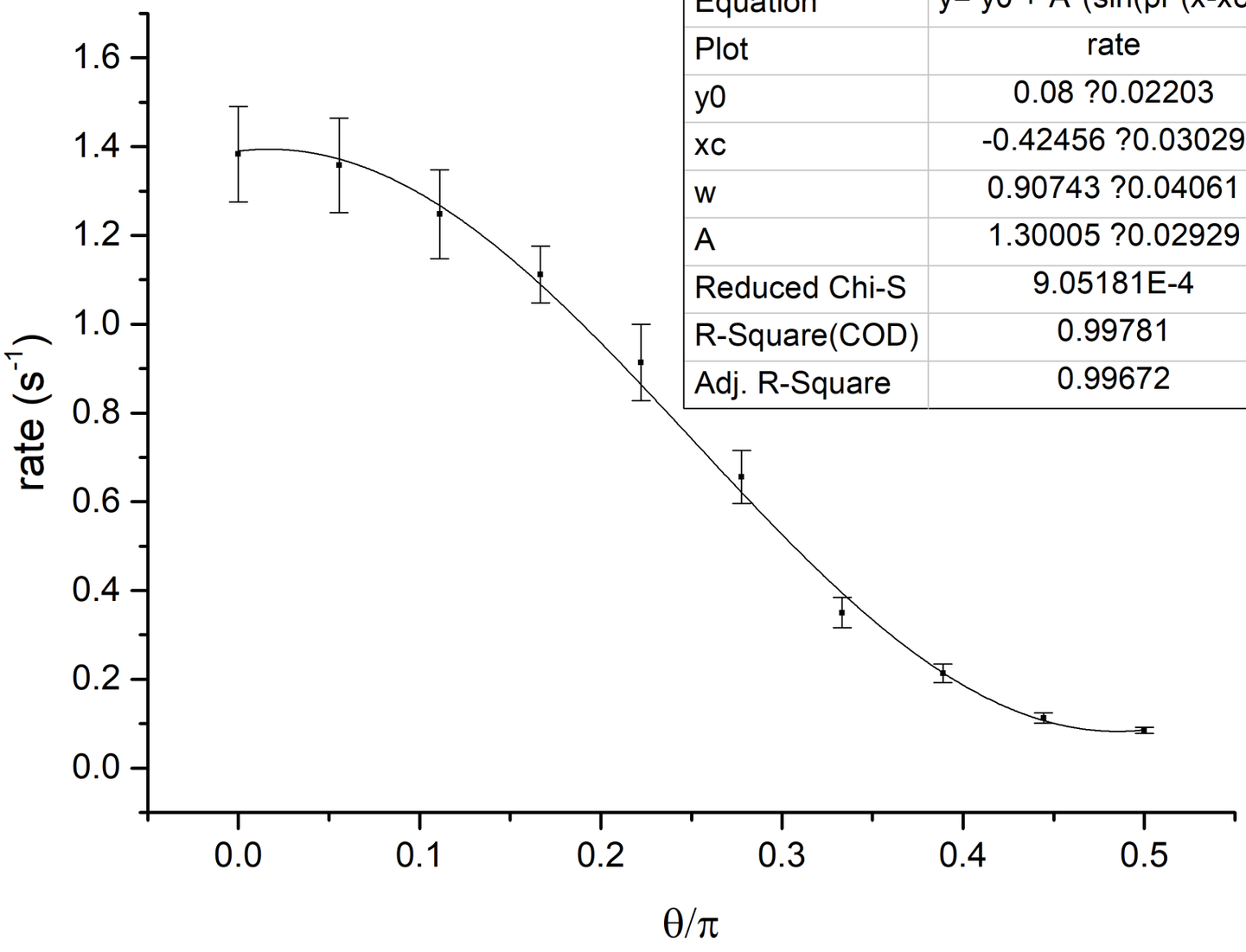
Solide Angle: 0.66

Area: 707 cm^2



Flux: 2.964x10^{-3} s^{-1} sr^{-1} cm^{-2}

Rate-Angle

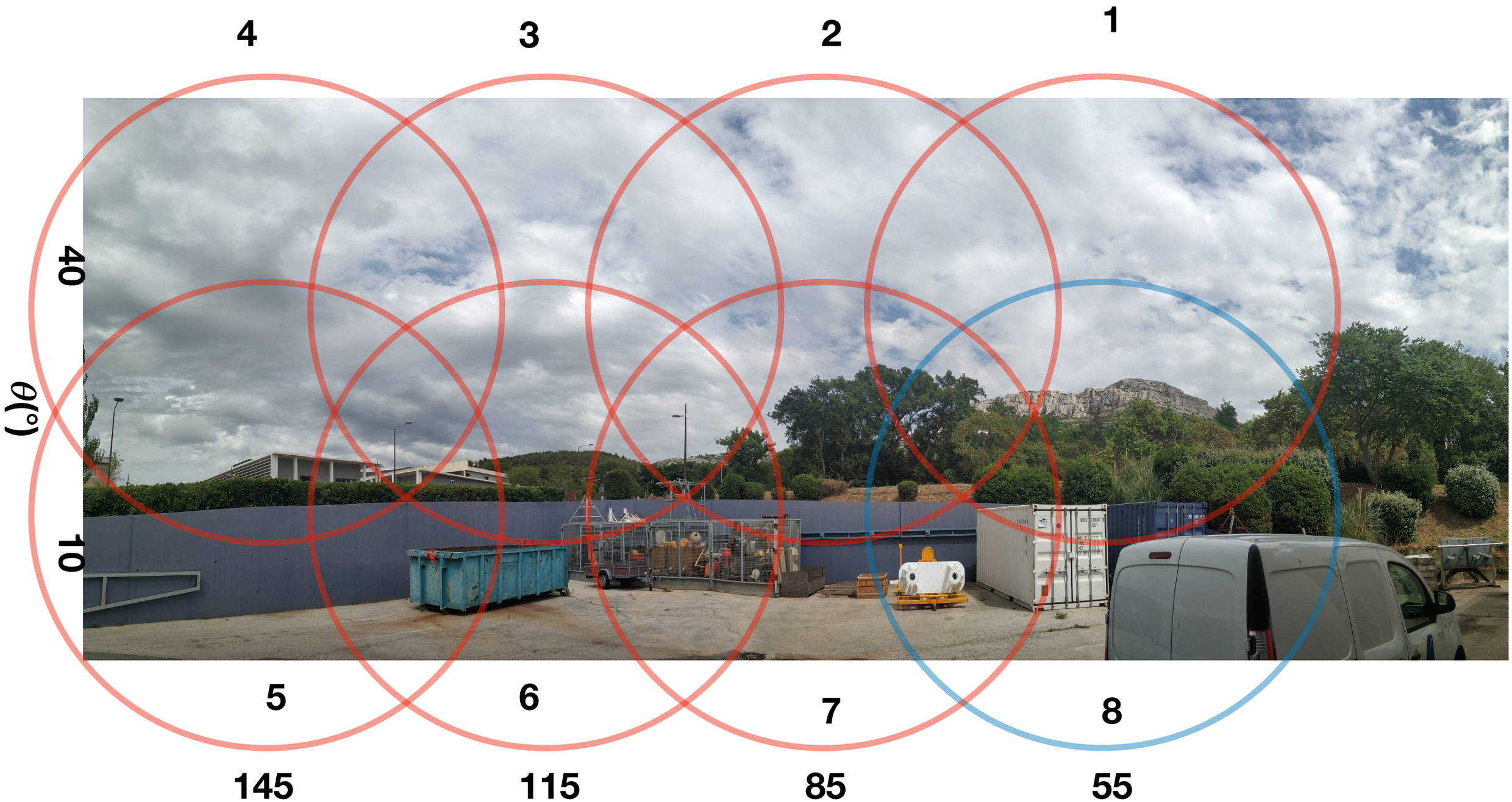


Model	SineSqr
Equation	y= y0 + A*(sin(pi*(x-xc)/w
Plot	rate
y0	0.08 ?0.02203
xc	-0.42456 ?0.03029
w	0.90743 ?0.04061
A	1.30005 ?0.02929
Reduced Chi-S	9.05181E-4
R-Square(COD)	0.99781
Adj. R-Square	0.99672

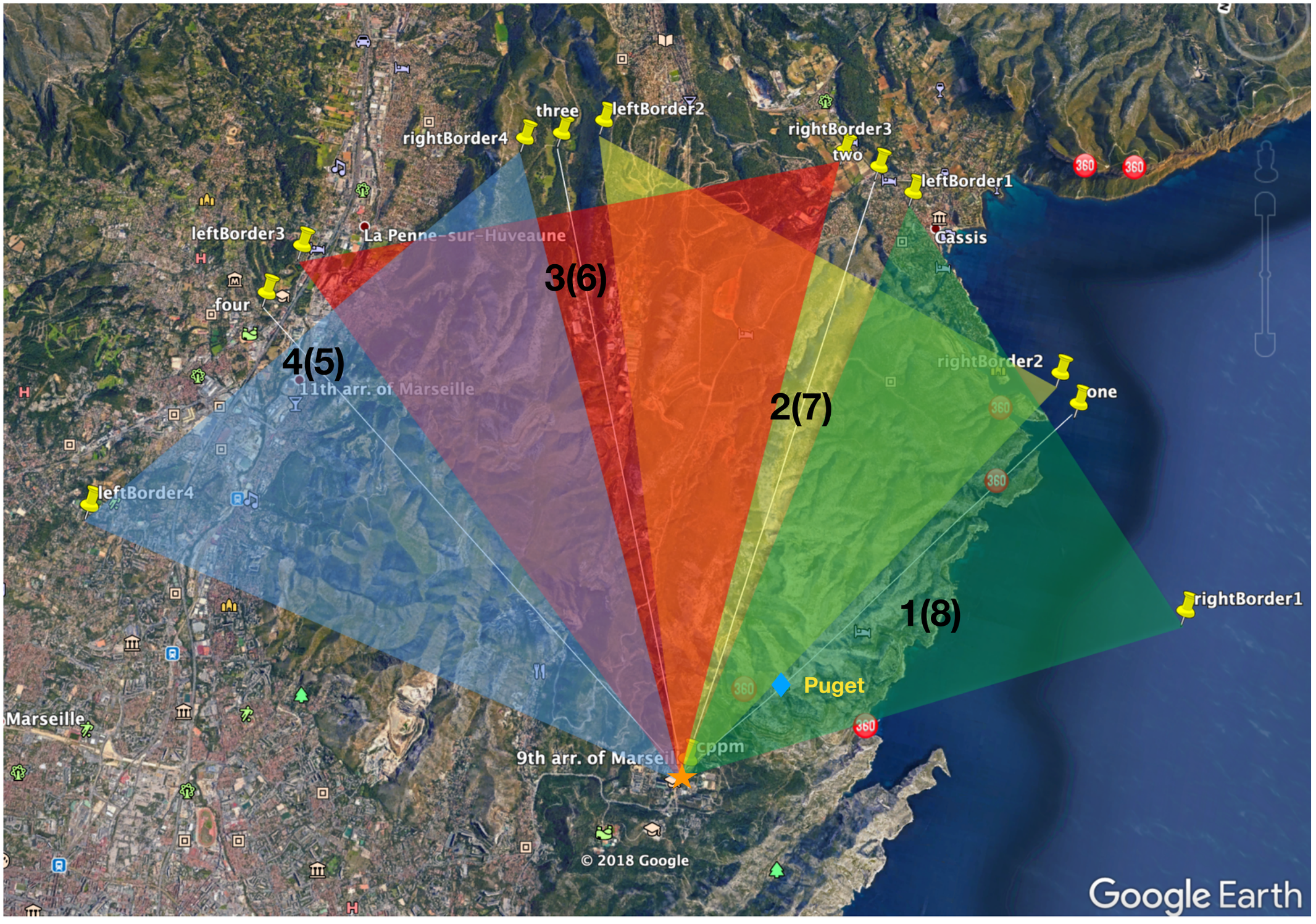
$$rate = 0.08 + 1.30\ \cos^2\left(\frac{\theta - 0.08\ \pi}{0.91}\right)$$

$$\chi^2 = 9.05 \times 10^{-4}$$

Scan Sky



Scan Sky


three
leftBorder2
rightBorder4
rightBorder3
two
leftBorder1
leftBorder3
La Penne-sur-Huveaune
Cassis
3(6)
four
4(5)
11th arr. of Marseille
rightBorder2
one
2(7)
leftBorder4
rightBorder1
1(8)
Puget
Marseille
cppm
9th arr. of Marseille
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Google Earth

Scan Sky

—Elevation profile

1(8)

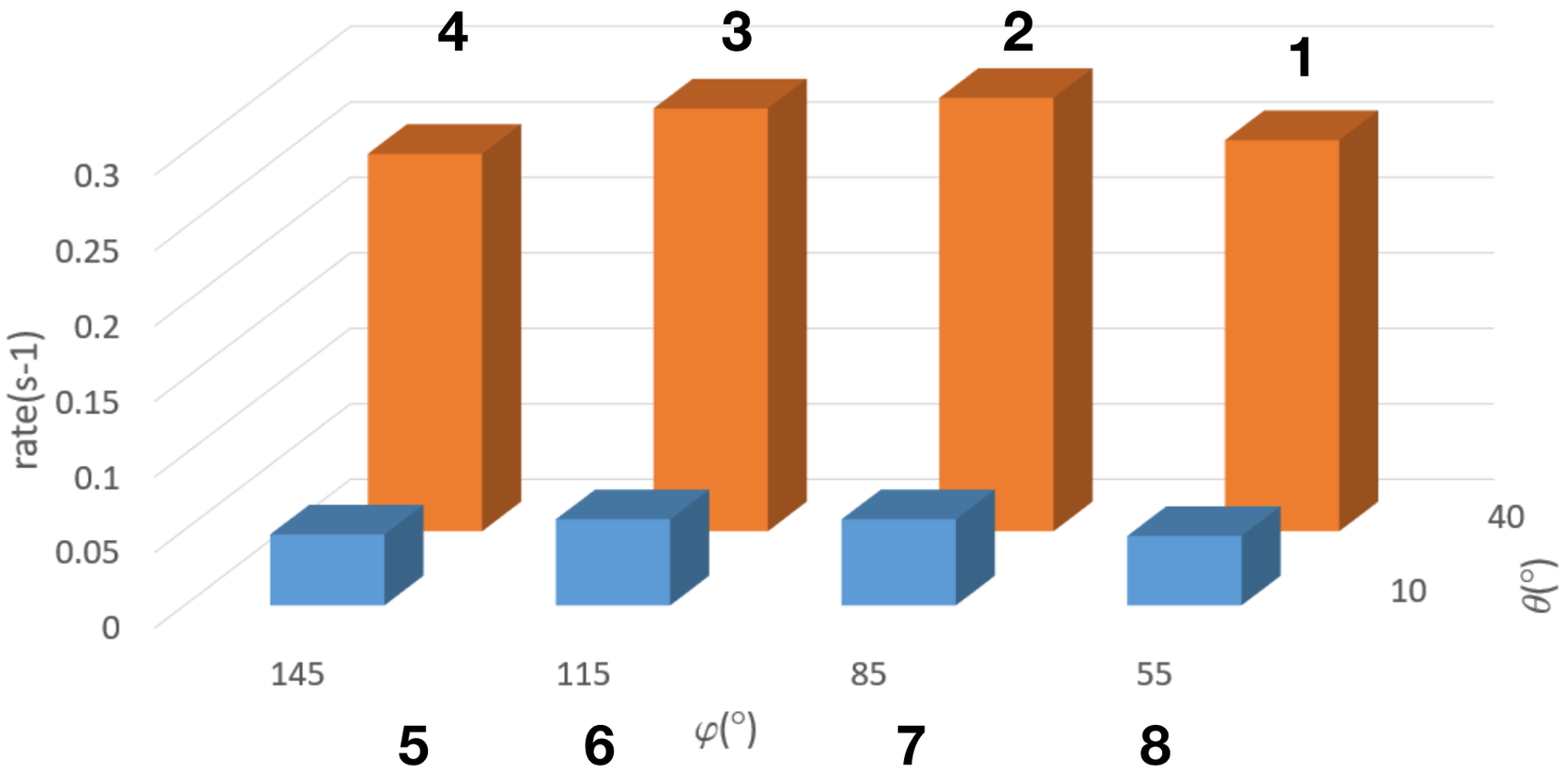
2(7)

3(6)

4(5)

Scan Sky

—Rate in each pixel



$$\frac{rate_{no\ Puget}}{rate_{Puget}} = 0.807$$

Conclusion

- **The atmosphere muon flux is 2.964×10^{-3} s^{-1} sr^{-1} cm^{-2}**
- **The rate distribution with vertical angle: $R \propto cos^2\theta$**
- **Muons are absorbed partly by Puget Mountain: reduce ~20%**

Conclusion

- ❖ **Pixel is very large**
- ❖ **Solid angle is very wide**
- ❖ **To improve the scan:**

  Lengthen the length of the two scintillator

Back Up

Rate-Angle measurement direction

b1