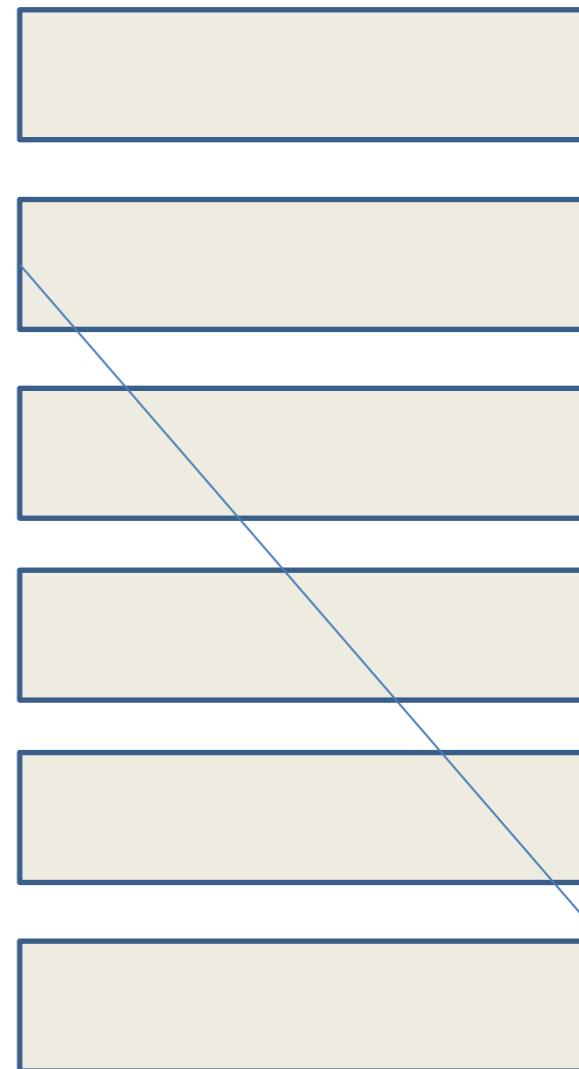


The Geometry of Scintillator Bars

2017/12/01
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Number of Bars a Cosmic Ray Pass Through

- Python code `nofbars.py` to calculate number of bars a cosmic ray pass through, when the path is given -> successful
- Depends on path (θ , ϕ , position) and dimension of bars

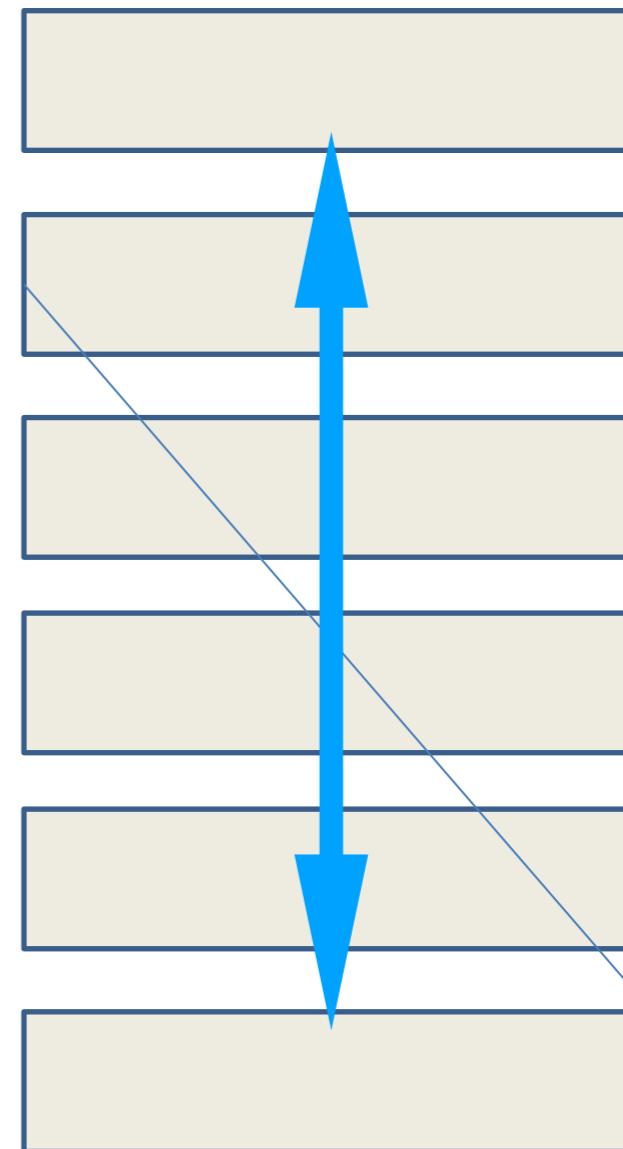


nofbars.py

```
kyeongro@KR-ThinkPad13: ~/CRrate
1 import math
2
3 # width means the width of incident plane of cosmic ray
4 def width(phi, a, b):
5     if 0<=phi<=math.acos(b/math.sqrt(a**2+b**2)):
6         w=b/math.cos(phi)
7     elif math.acos(b/sqrt(a**2+b**2)):
8         w=a/math.sin(phi)
9     return w
10
11 # nofbars is a fuction to calculate the number of bars a cosmic ray passes
12 # when its trajectory is given
13 # the number of bars is saved as variable 'm'
14 def nofbars(theta, phi, x0, a, b, c, h):
15     m=0
16     for n in range(1,13,1):
17         if 0<=math.tan(theta)*(((n-1)*c+(n-1)*h)-x0)<=width(phi, a, b) or 0<=math.tan(theta)*((n*c+(n-1)*h)-x0)<=wid-
18             th(phi, a, b):
19             m+=1
20         else:
21             continue
22     return m
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559 창 캡처(W)
```

Probability Function

- Implemented the probability function of theta and phi, for each case of number (1, 2, 3, ...) -> probability.py -> successful!
- Not an exact solution, but the precision can easily be adjusted to enough standard



probability.py

```
kyeongro@KR-ThinkPad13: ~/CRrate
15
16 d0=0
17 d1=0
18 d2=0
19 d3=0
20 d4=0
21 d5=0
22 d6=0
23 d7=0
24 d8=0
25 d9=0
26 d10=0
27 d11=0
28 d12=0
29
30 d=0.001 # adjustable increment
31
32 x0=-width(phi, a, b)/math.tan(theta)
33 # error occurs when theta==0
34
35 while x0<=12*c+11*h:
36     x0+=d
37     m=nofbars(theta, phi, x0, a, b, c, h)
38     if m==1:
39         d1+=d
40     elif m==2:
41         d2+=d
42     elif m==3:
43         d3+=d
44     elif m==4:
45         d4+=d
46     elif m==5:
47         d5+=d
48     elif m==6:
49         d6+=d
50     elif m==7:
51         d7+=d
52     elif m==8:
53         d8+=d
54     elif m==9:
```

● 창 캡처(W)

54,5 17%

Remaining Steps

- Implementing theta-dependent (i.e. phi-independent) distribution (probably discrete) to the rate calculation.
- Comparison with data