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Moving Optics

- Velocity selector
- Disk Chopper
- Fermi Chopper

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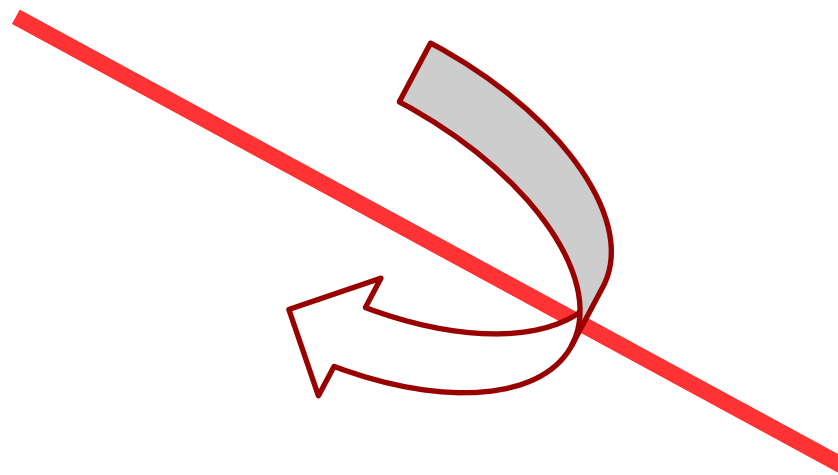
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Not optics that move... but



...optics with moving
parts

Moving Optics

I.e. we can't do:

```
COMPONENT something = Sometype(
    par1=value1, par2=value2, ...)
AT( f_x(t), f_y(t), f_z(t) )RELATIVE someother
```

So what *can* we do?



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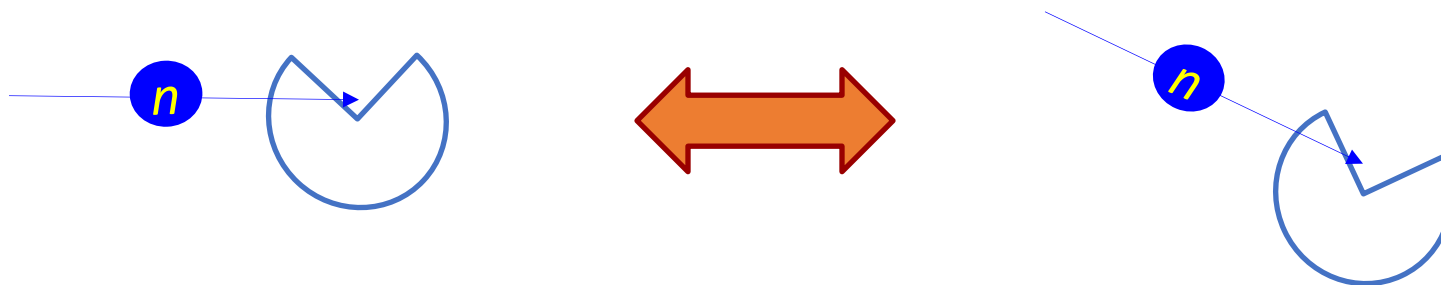
Moving Optics

I.e. we can't do:

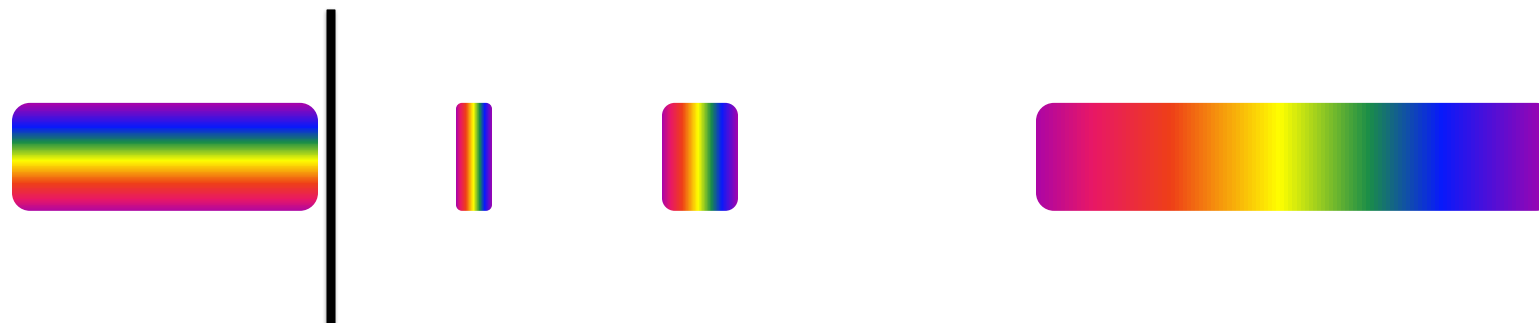
```
COMPONENT something = Sometype(
    par1=value1, par2=value2, ...)
AT( f_x(t), f_y(t), f_z(t) )RELATIVE someother
```

So what *can* we do?

Instead, we operate internally in the component on the neutron state, e.g. “rotate” the neutron etc.



DISK CHOPPER



Define time structure of the beam

Time Of Flight (TOF) measurements

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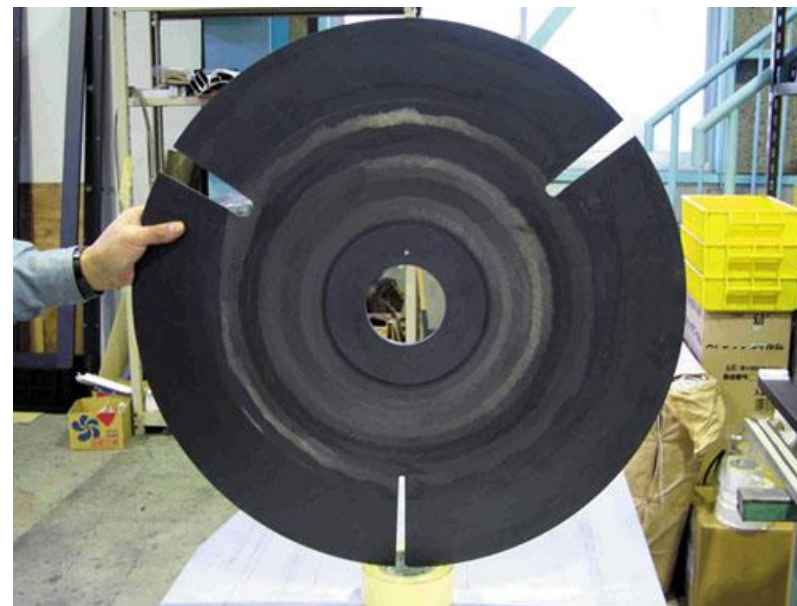
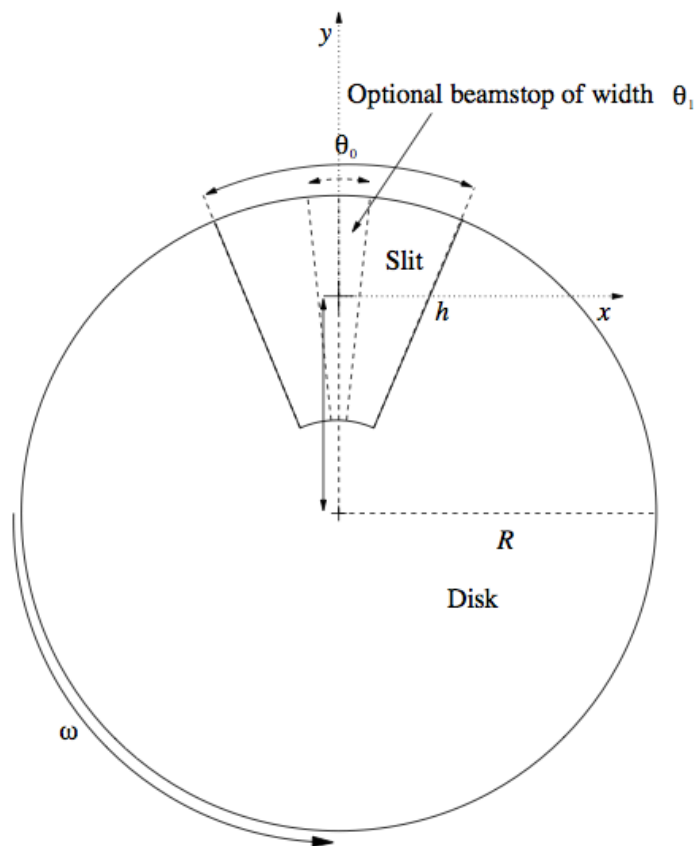
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Disk Chopper



Disk Chopper

Input parameters

Parameters in **boldface** are required; the others are optional.

Name	Unit	Description	Default
theta_0	deg	Angular width of the slits.	0
radius	m	Radius of the disc	0.5
yheight	m	Slit height (if = 0, equal to radius). Auto centering of beam at half height.	
nu	algebraic sign defines the direction of rotation	[Hz] Frequency of the Chopper, $\omega = 2\pi \cdot \nu$	
nslit	1	Number of slits, regularly arranged around the disk	3
jitter	s	Jitter in the time phase	0
delay	s	Time 'delay'	0
isfirst	it then spreads the neutron time distribution	[0/1] Set it to 1 for the first chopper position in a cw source	0
n_pulse	Only if isfirst	[1] Number of pulses	1
abs_out	0/1	Absorb neutrons hitting outside of chopper radius?	1
phase	overrides delay	[deg] Angular 'delay'	0
xwidth	m	Horizontal slit width opening at beam center	0
verbose	1	Set to 1 to display Disk chopper configuration	0

Disk Chopper

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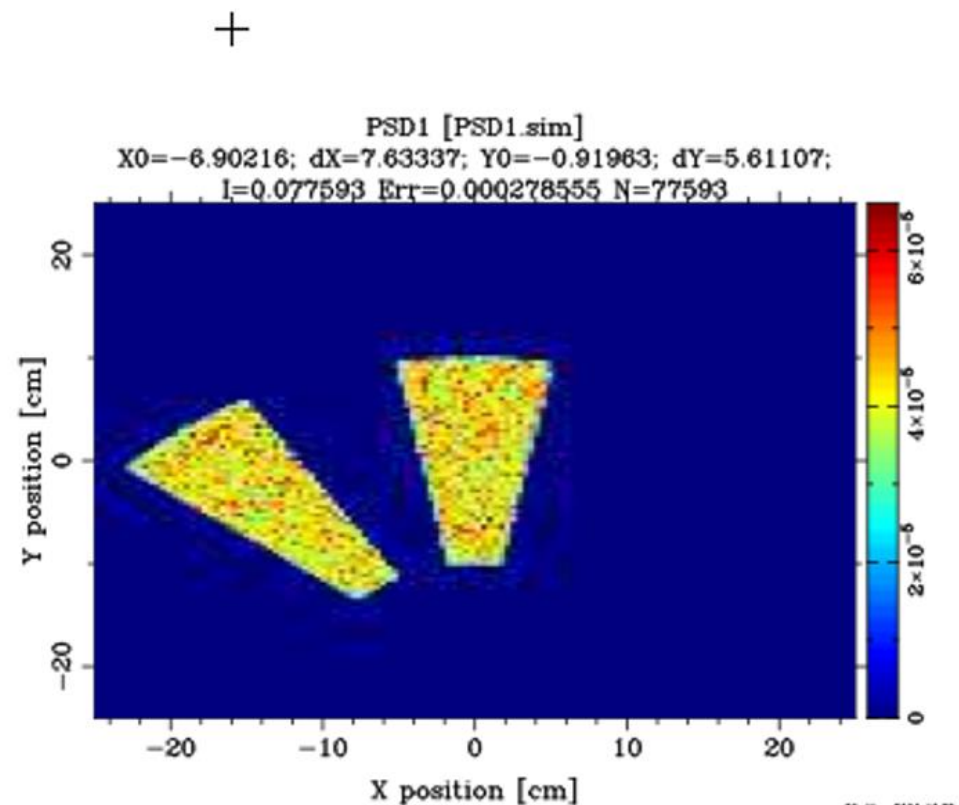
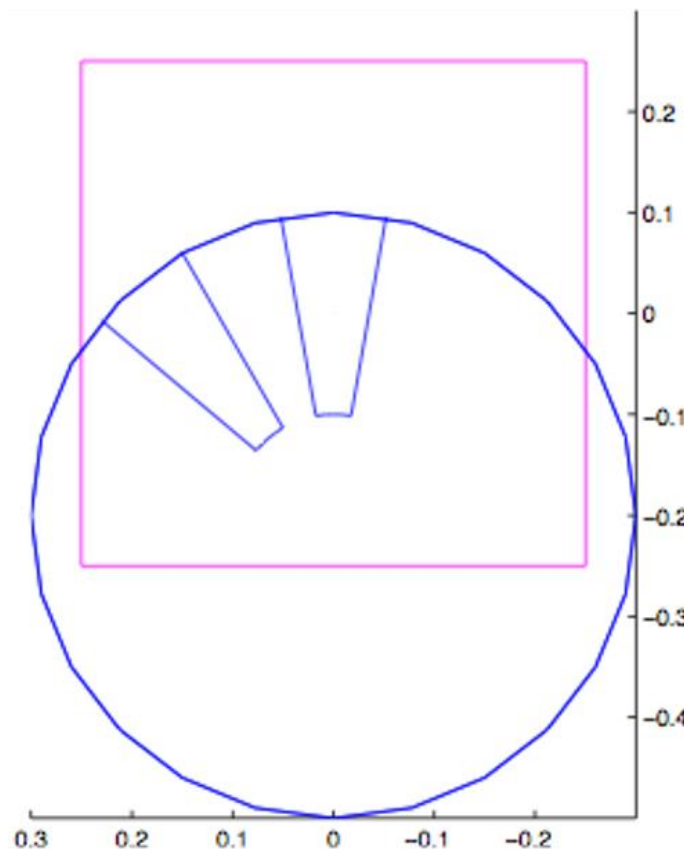
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Disk Chopper

Let's do an exercise on this – head on over to github and find it there:

https://github.com/McStasMcXtrace/Schools/tree/master/ESS_May_2021/Wednesday_May_5th/4_Choppers_and_other_rotating_optics



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Fermi Chopper

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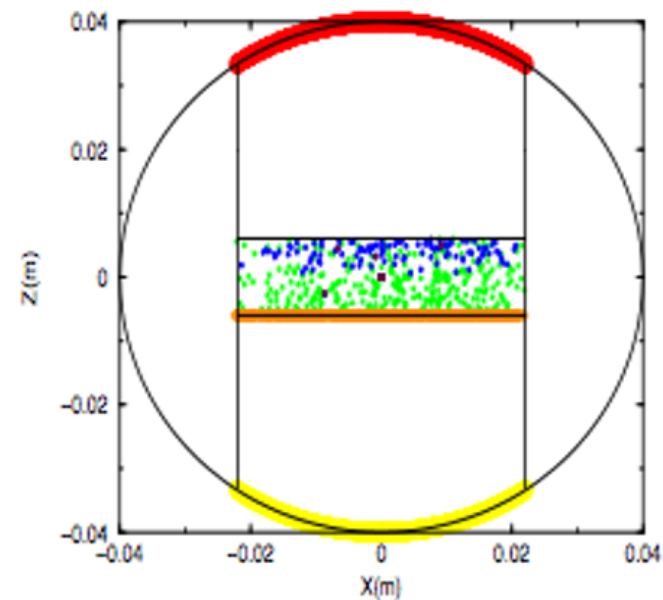
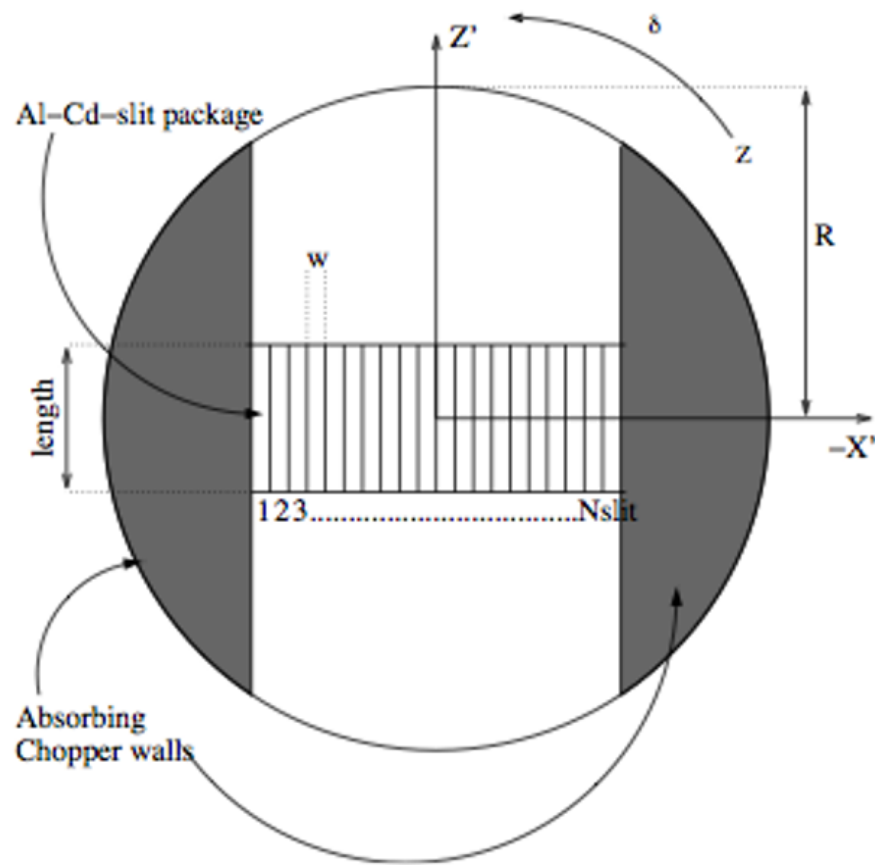
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Velocity Selectors

-

Select the neutron energy you want

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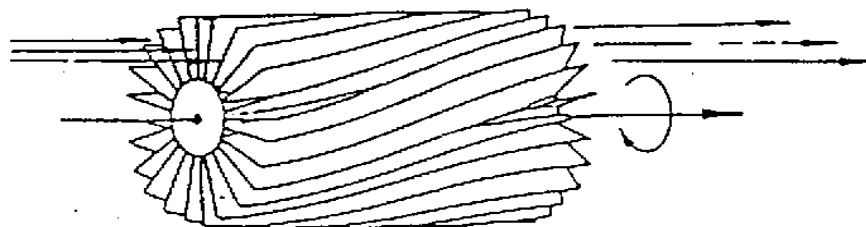
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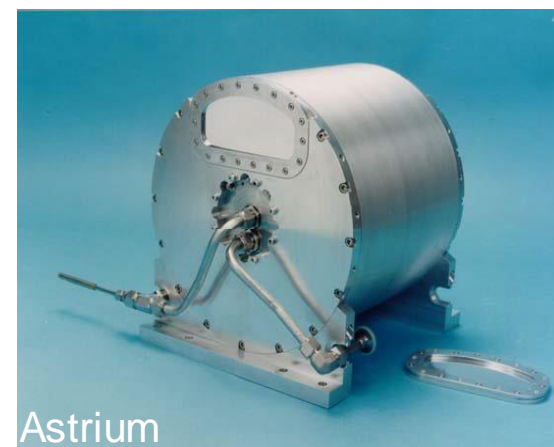
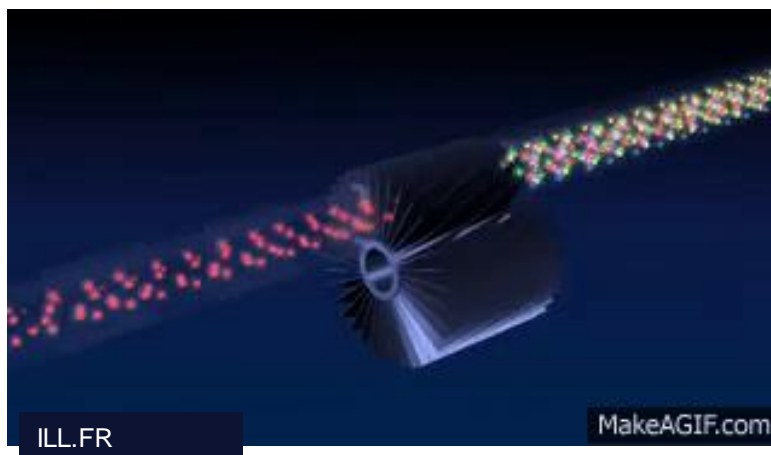
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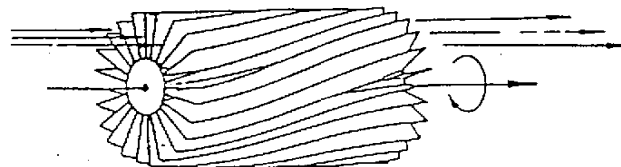
Velocity Selectors



‘broad’ monochromatization $\delta\lambda/\lambda \approx 10\%$



Velocity Selector



Input parameters

Parameters in **boldface** are required; the others are optional.

Name	Unit	Description	Default
xwidth	m	Width of entry aperture	0.03
yheight	m	Height of entry aperture	0.05
zdepth	m	Distance between apertures, for housing containing the rotor	0.30
radius	m	Height from aperture centre to rotation axis	0.12
alpha	deg	Twist angle along the cylinder	48.298
length	less than zdepth	[m] Length of cylinder/rotor	0.25
d	m	Thickness of blades	0.0004
nu	Hz	Cylinder rotation speed, counter-clockwise, which is ideally $3956 \cdot \alpha \cdot \text{DEG2RAD} / 2 / \pi / \lambda / \text{length}$	300
nslit	1	Number of Soller blades	72

} housing



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Velocity Selectors

Let's do an exercise on this also:

Go to the same place on github you were before and do the second Task:

https://github.com/McStasMcXtrace/Schools/blob/master/ISIS_April_2021/Tuesday_April_13th/4_Choppers_and_other_rotating_optics/README.md