

 HighNess

McStas



2021

HighNESS

Virtual

McStas

School



Moving Optics

- Velocity selector
- Disk Chopper
- Fermi Chopper

 HighNess

McStas



2021

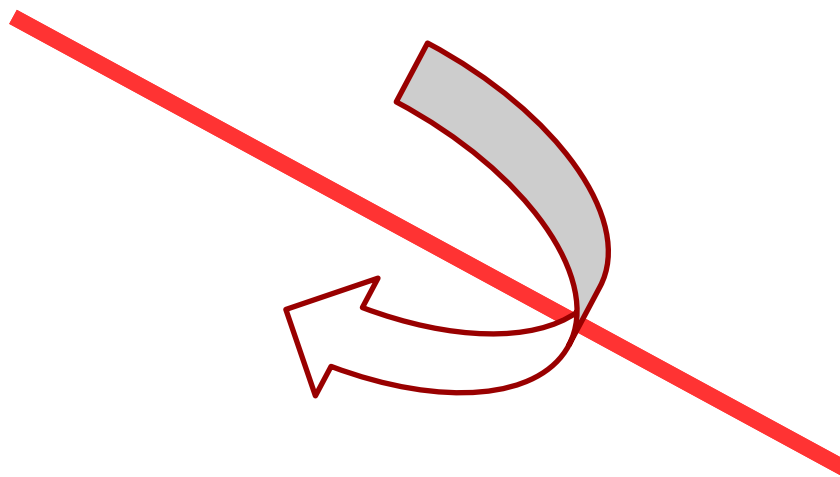
HighNESS

Virtual

McStas

School

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?



McStas



2021

HighNESS

Virtual

McStas

School

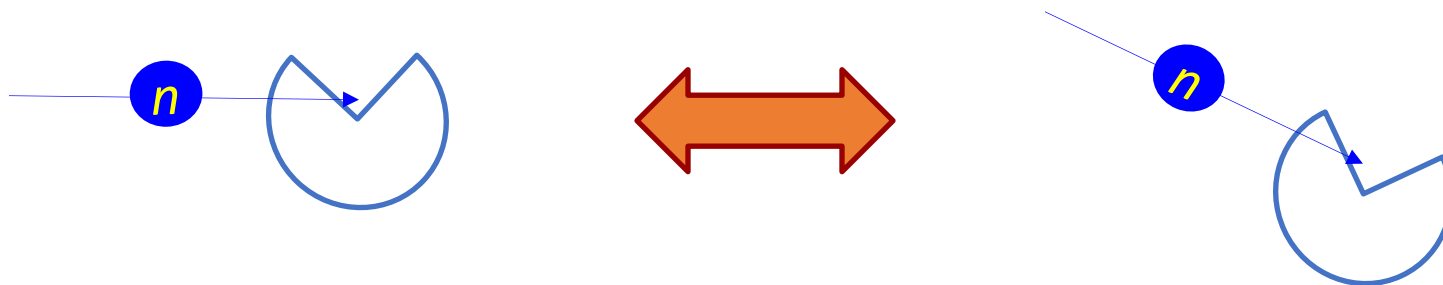
Moving Optics

I.e. we can't do:

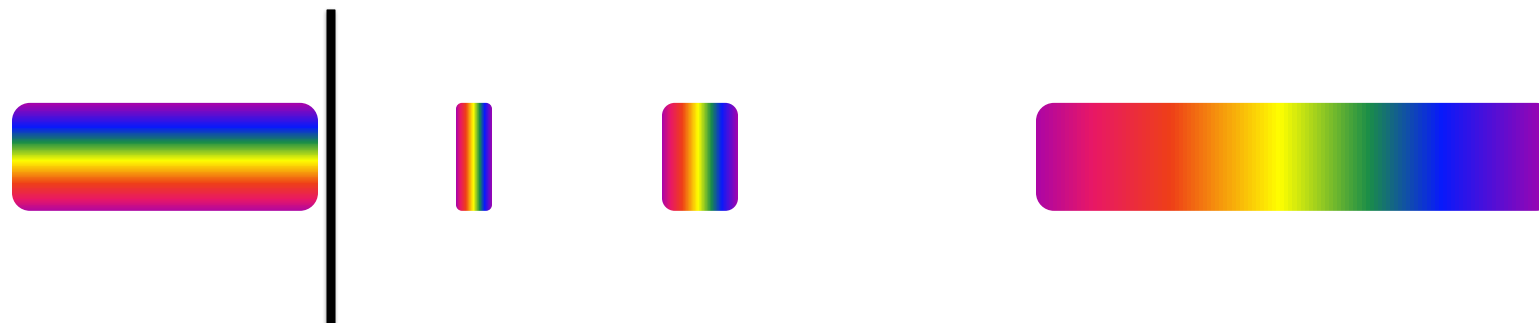
```
COMPONENT something = Sometype(
    par1=value1, par2=value2, ...)
AT( f_x(t), f_y(t), f_z(t) )RELATIVE someother
```

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

 HighNess

McStas



2021

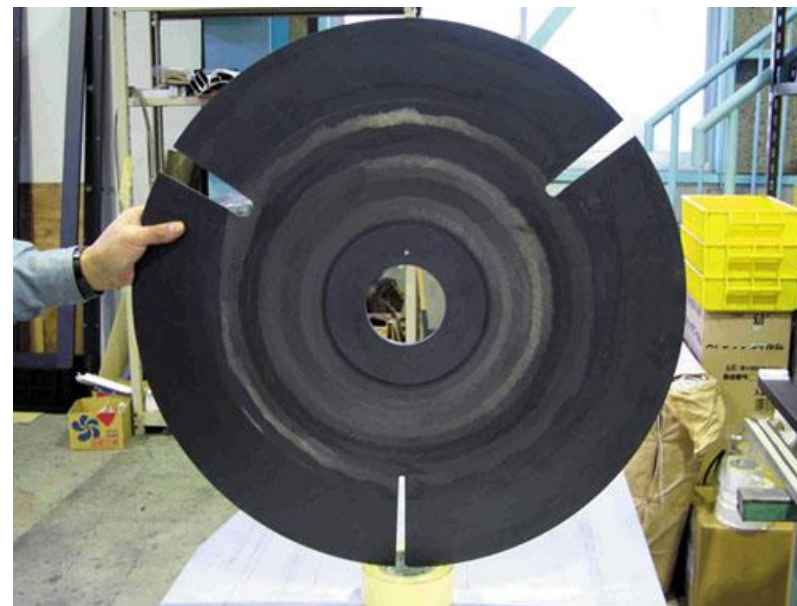
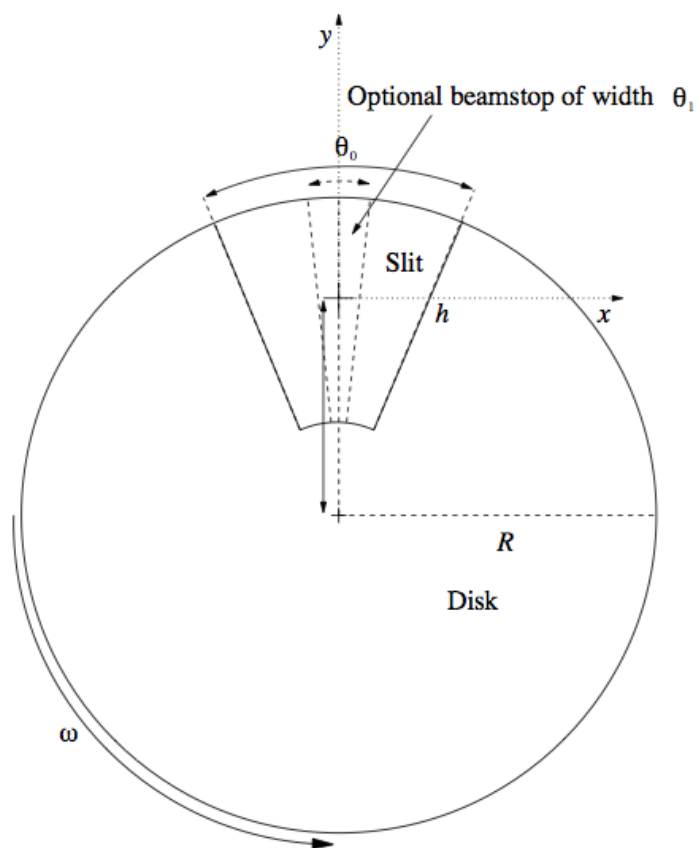
HighNESS

Virtual

McStas

School

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, $\omega = 2\pi \nu$	
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

 HighNess

McStas



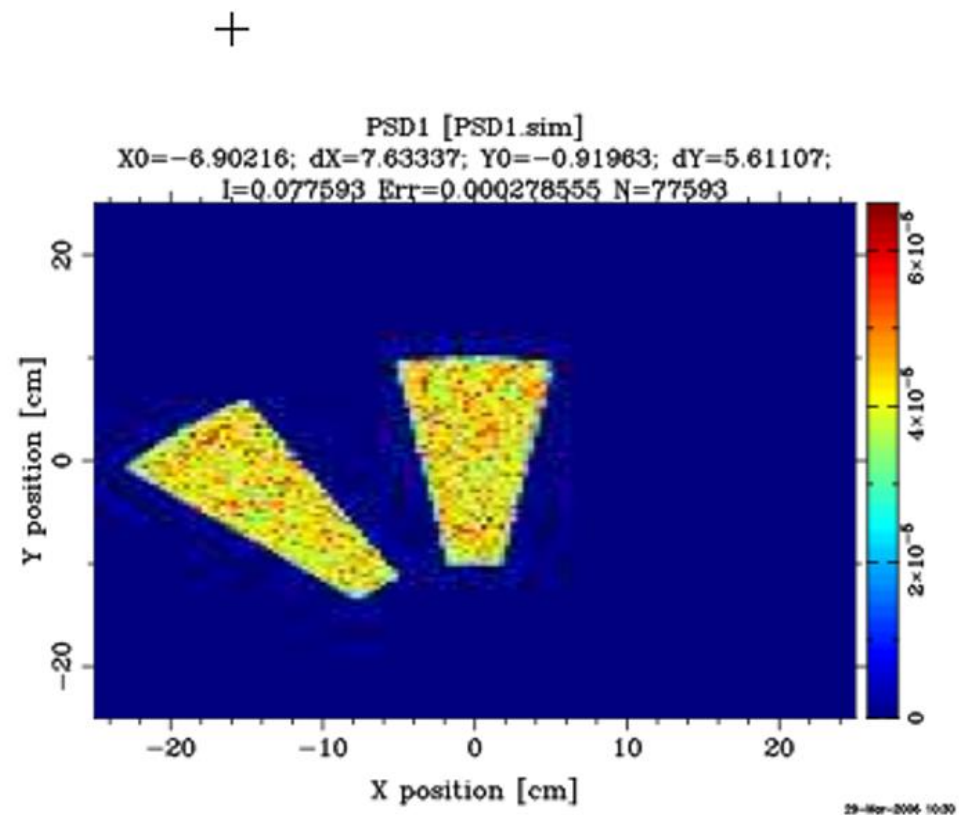
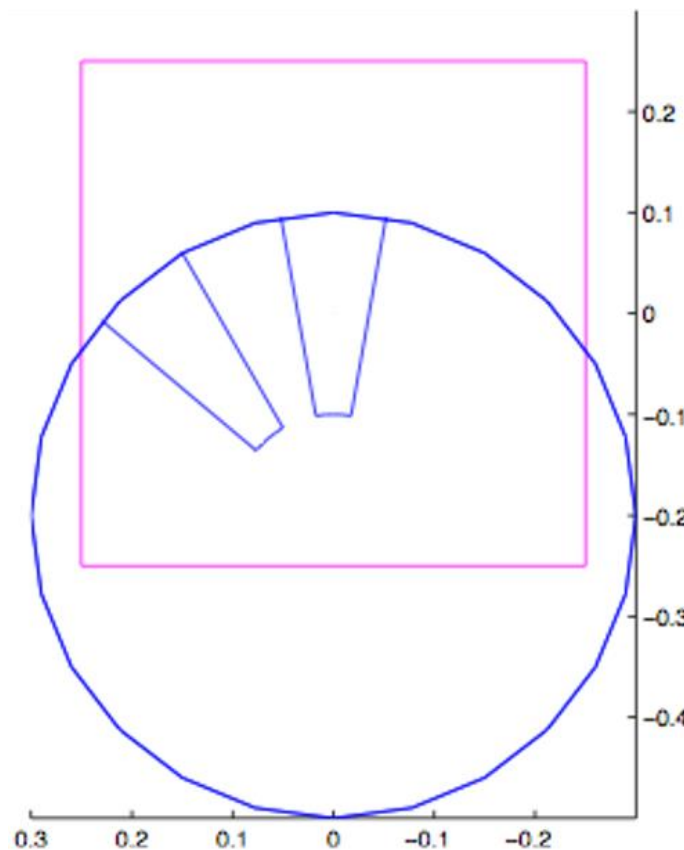
2021

HighNESS

Virtual

McStas

School



Disk Chopper

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

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



McStas



2021

HighNESS
Virtual
McStas
School

Fermi Chopper

HighNess

McStas



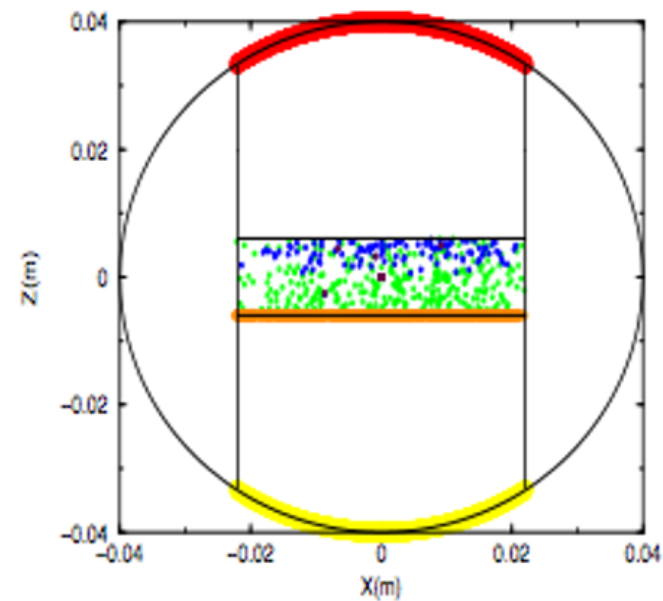
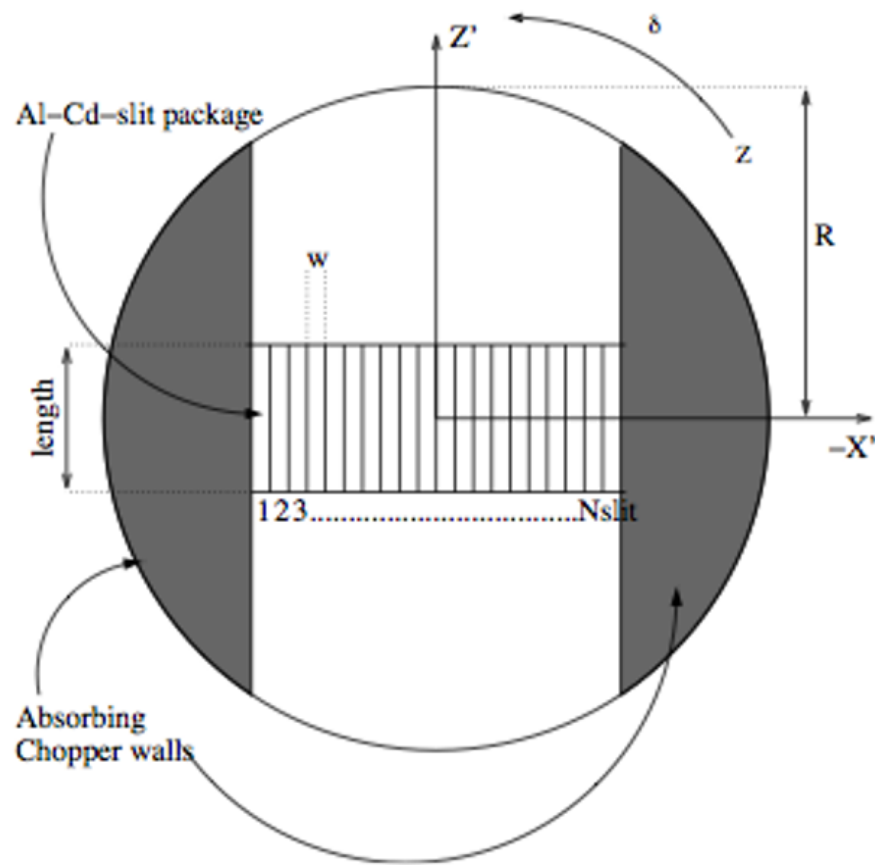
2021

HighNESS

Virtual

McStas

School



 HighNess

McStas



2021

HighNESS

Virtual

McStas

School



Velocity Selectors

-

Select the neutron energy you want



McStas



2021

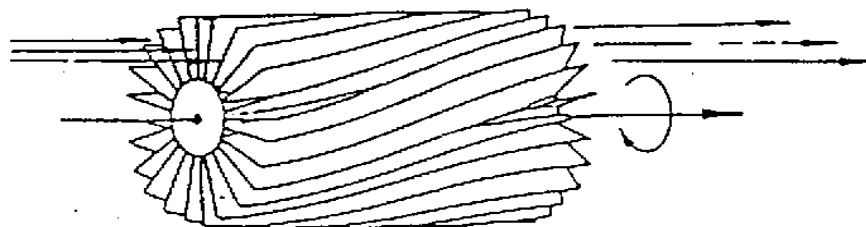
HighNESS

Virtual

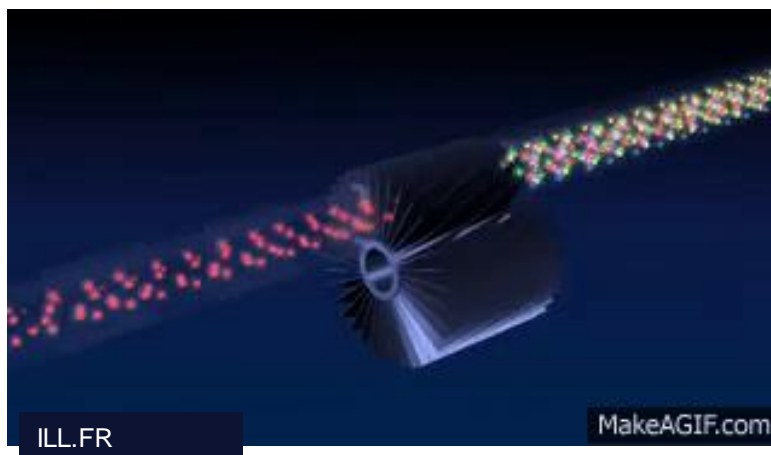
McStas

School

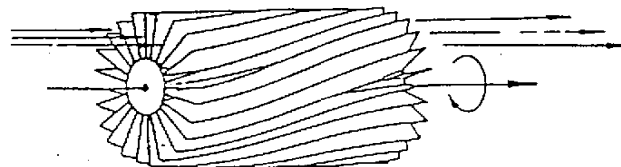
Velocity Selectors



‘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



McStas



2021

HighNESS

Virtual

McStas

School

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