Realistic Laue cameras

- using advanced McStas keywords and a look at polycrystal-samples

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Agenda

- *Polycrystals - how to describe them?*
- *Combining a powder sample with a Single Crystal*
- *Tricking the Single_crystal…*
- *A reminder of the GROUP and SPLIT keywords*
- *The dangerous JUMP keyword*
- *A at look at the TOPAZ and SENJU instruments*

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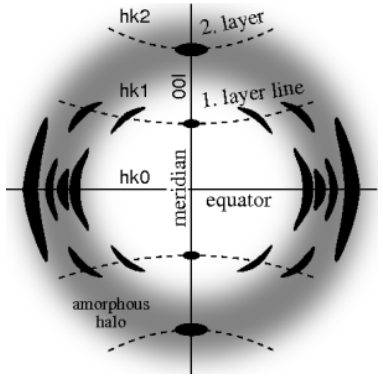
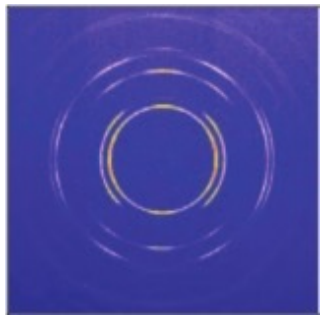
From single crystal / crystallites to powder….

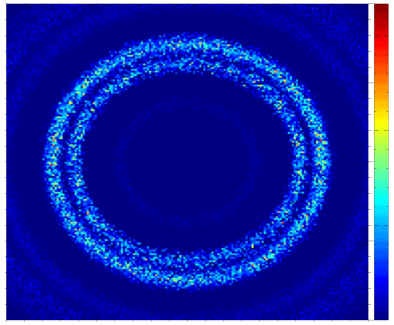
- Single crystal

- Polycrystal with a little disorder, i.e. a *preferred orientation, texture*





- Powder with complete disorder



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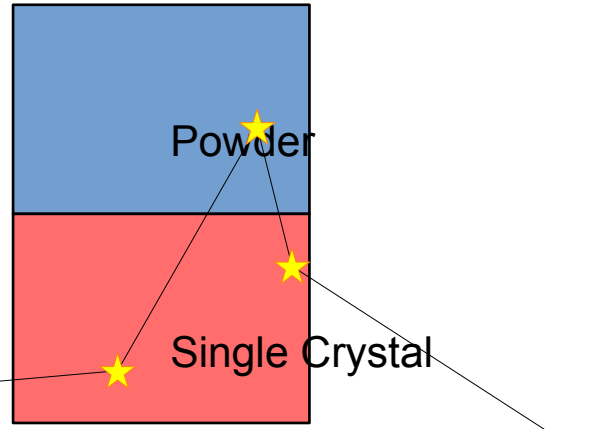
Powder SX combination

- Use a **GROUP**!
- … but also allow reentry – How?

```
COMPONENT a1 = Arm()
AT(0,0,0) RELATIVE sample_pos
EXTEND
%{
        sample_scatter=0;
%}
COMPONENT pow = PowderN( … )
AT(0,h/2,0) RELATIVE a1
GROUP sample
EXTEND
%{
        if(SCATTERED) sample_scatter=1;
%}


COMPONENT sx = Single_crystal( …)
AT(0,-h/2,0) RELATIVE a1
GROUP sample
```



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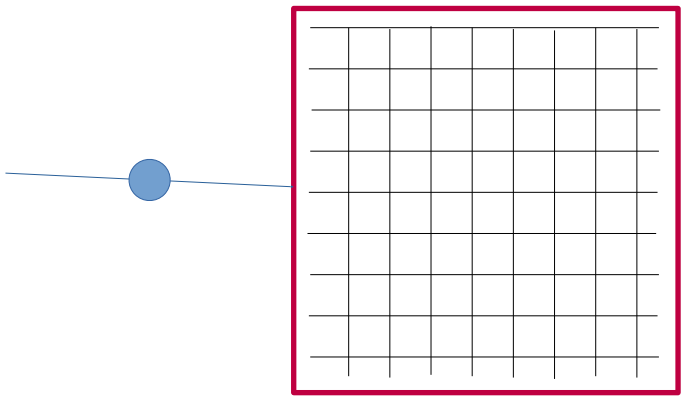
Extending that idea

A polycrystal as many Single crystals

The idea: Cheat a single Single_crystal into believing it is many...



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EUROPEAN SPALLATION SOURCE

中国散裂中子源

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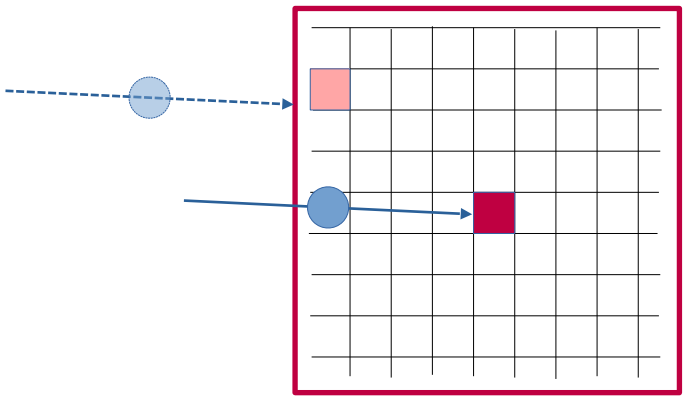
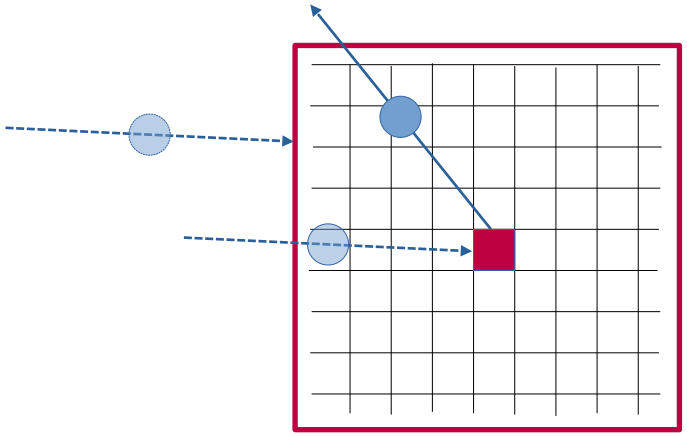
McStas

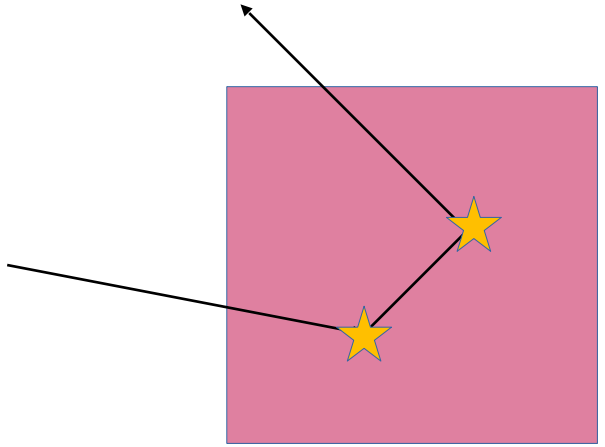
Apply translation



Single_crystal as polycrystal

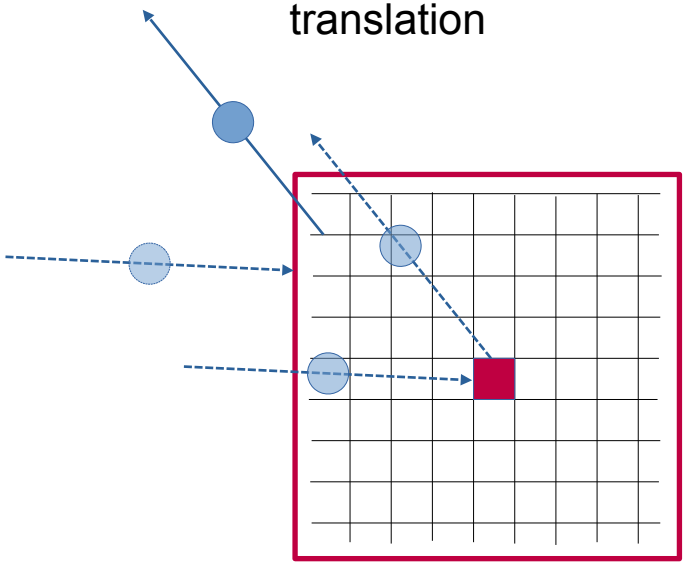


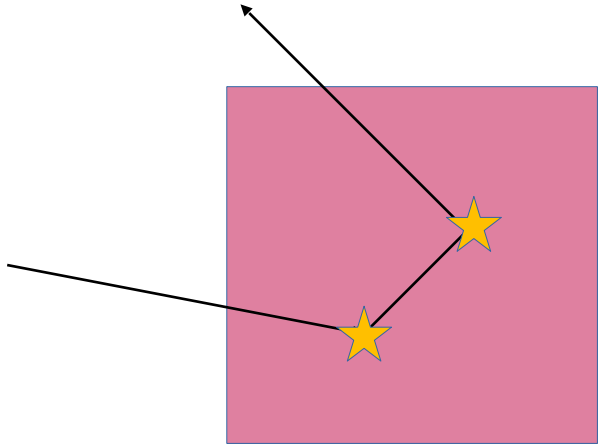
Apply translation



Scattering events happen in the crystal neutron exits.

Single_crystal as polycrystal



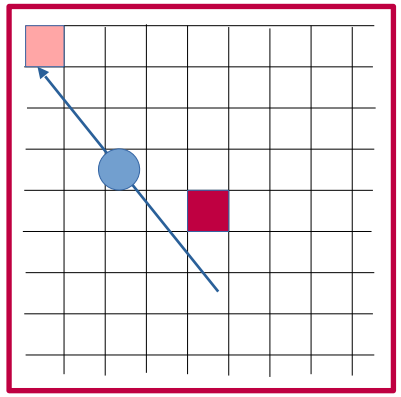


Scattering events happen
in the crystal
neutron exits.

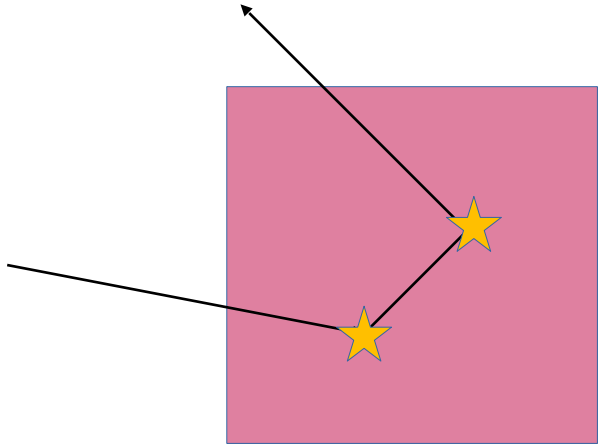
Single_crystal as polycrystal

Apply inverse translation

Neutron may enter a new subcrystal...



Apply translation



Scattering events happen in the crystal neutron exits.

TOPAZ and SENJU

Take a look at a couple of "real" instrument simulations of Laue Cameras:

they both resides in GitHub under today / 3_Laue_diffractometers_TOPAZ\&SENJU/

1. SNS TOPAZ
2. J.PARC SENJU (aka. BL18)
   Here you need to also copy a datafile for the J-PARC source "`source_BL18.txt`"

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