

Sample Environments

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Sample environments

- Concentric geometries
- Background estimates
- Separation of contributions



Disclaimer: in case of errors and uncertainties, please correct me...



Background ?

A sample environment is all that surrounds sample.

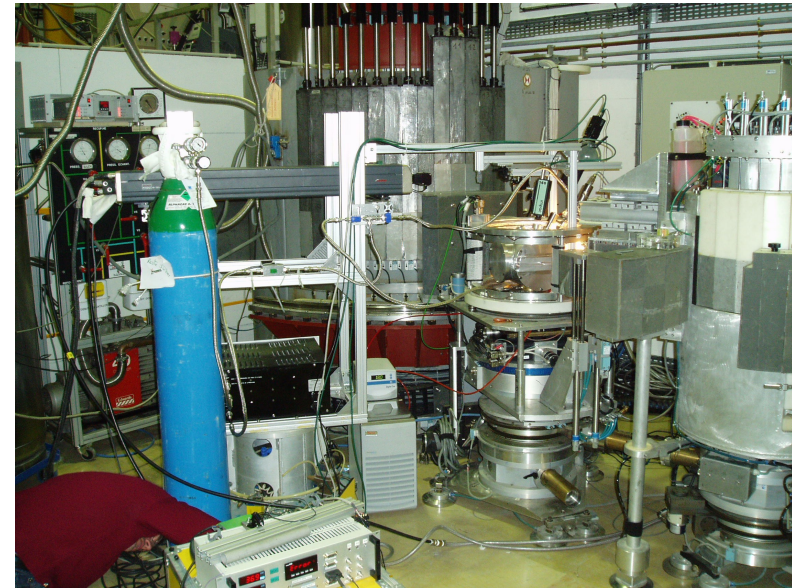
A background is all we do not want.

Usual environments are concentric:

- Furnaces
- Cryostats

Some may be non-concentric/symmetric:

- Magnets
- Pressure cells
- Boxes



Just a big mess that scatters everywhere...

Some materials used in sample environments:

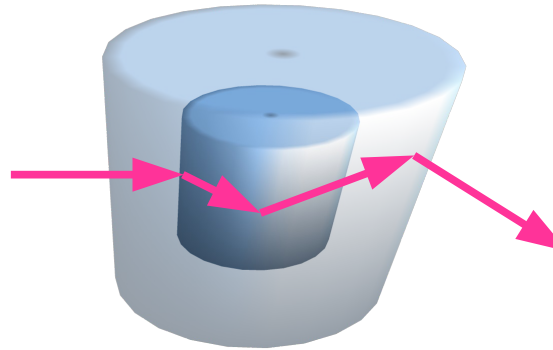
Al, Cu, Nb, V, ...



Concentric geometries

- Concentric shapes in some components:

- *Incoherent*
- *PowderN*
- *Isotropic_Sqw*



Box, sphere,
cylinder

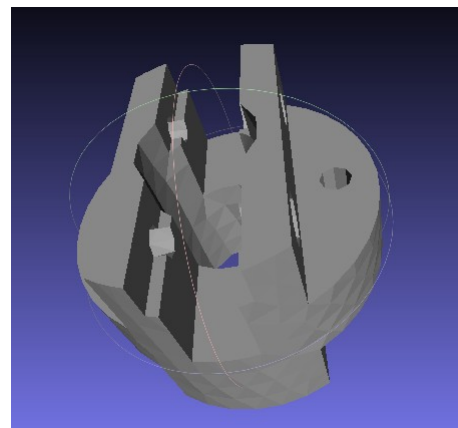
- The '**concentric=1**' parameter allows to '**release**' the neutron inside the shape.
- Requires to **duplicate** external components as if they would be formed of two half volumes.

```
Comp1_in    = PowderN(concentric=1, ...)  
Comp2_in    = PowderN(concentric=1, ...)  
Sample      = Single_crystal  
Comp2_out   = COPY(Comp2_in) (concentric=0)  
Comp1_out   = COPY(Comp1_in) (concentric=0)
```



Complex shapes

- Arbitrary polygon shapes in some components
 - Incoherent
 - PowderN
 - Isotropic_Sqw
 - Single_crystal
 - Guide_anyshape (reflecting)
- But **NO** simultaneous concentric support
- Used with `geometry="OFF or PLY file"`
- Can be used to e.g. model housing, pillars, ...



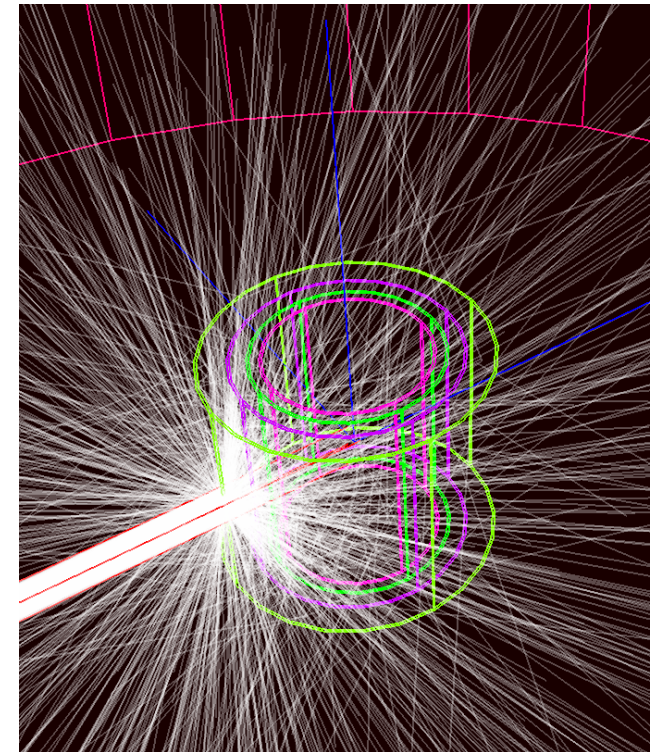
SampleEnv: Exercise 1

- Re-use the `Liquid_simple` (9.4 Sqw) or `single_crystal` (9.3 SX) instruments.
- **Cryostat:** Add `PowderN` concentric shields with ϕ 12, 9.5, 8, and 7 cm, thickness 1 mm, height 10 cm, made of “`Al.laz`” before the sample. Use '`concentric=1`' everywhere. You may use the **COPY** keyword.
- Repeat in reverse order these shields after the sample with '`concentric=0`'. You may use the **COPY** keyword.



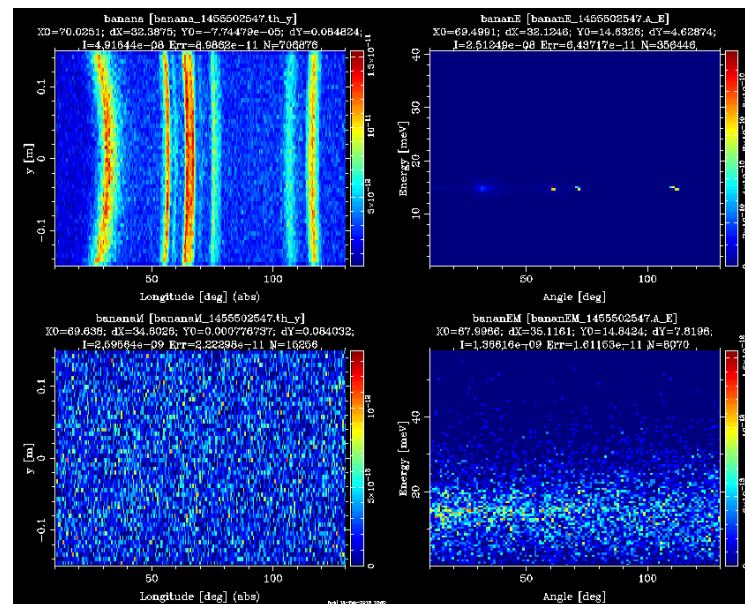
SampleEnv: Exercise 1

- Run in Trace 3D mode to check the geometry.
- The incident beam is spread onto the Al shields.
- The scattering on these must be 'reduced' to 'see' the sample.
- We use $p_{\text{transmit}}=0.95$,
 $p_{\text{inc}}=0.01$
in PowderN instances.



SampleEnv: Exercise 1

- Re-run in Simulation/PGPLOT mode
- Plot results



- Interpret the results
- How to separate the 'sample' contribution

