Ex. 1: Basics, Source, Monitors, Guides, continued

1.2-4, curved, ballistic, elliptic and parabolic guides

1.2: Curved guide:

Open the instrumentfile Ex_1_2.instr given to you

Study the instrumentfile, notice use of the PREVIOUS keyword

Notice input parameters of guide m-value, angular rotation of guide segments

Question: What is the relevant rotation angle to achieve a guide curvature of 1 km?

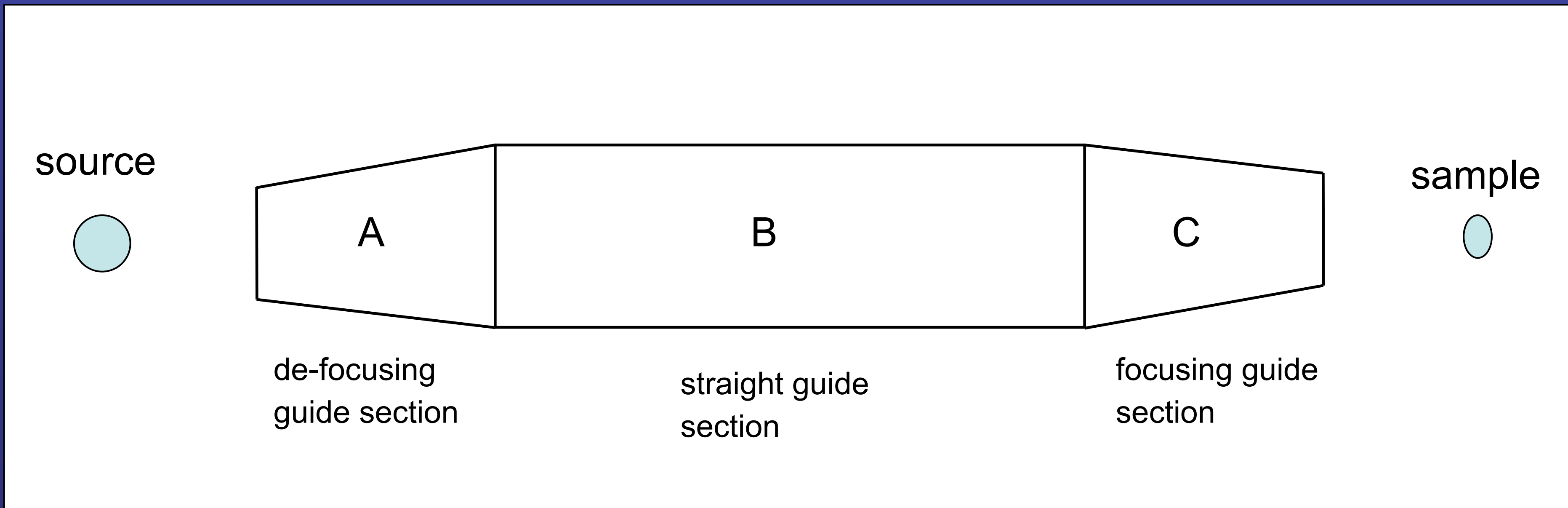
Try performing a TRACE

Try varying the guide curvature, notice effect on divergence and beam profile

Other curved guides:

- Use McDoc -> Component Library Index to look at Guide_curved plus Bender from the McStas lib

1.3 Ballistic Guides



Goal : transport/focus more neutrons at the sample position

Disadvantage: increasing neutron divergence

Simulation: using standard guide component

1.3: Ballistic guide:

Open the instrumentfile Ex_1_3.instr given to you

Study the instrumentfile, notice use of the DECLARE and INITIALIZE sections

Notice the use of Source_gen to describe the PSI cold source

Notice the input parameter sa_pos, to vary the guide - sample position distance.

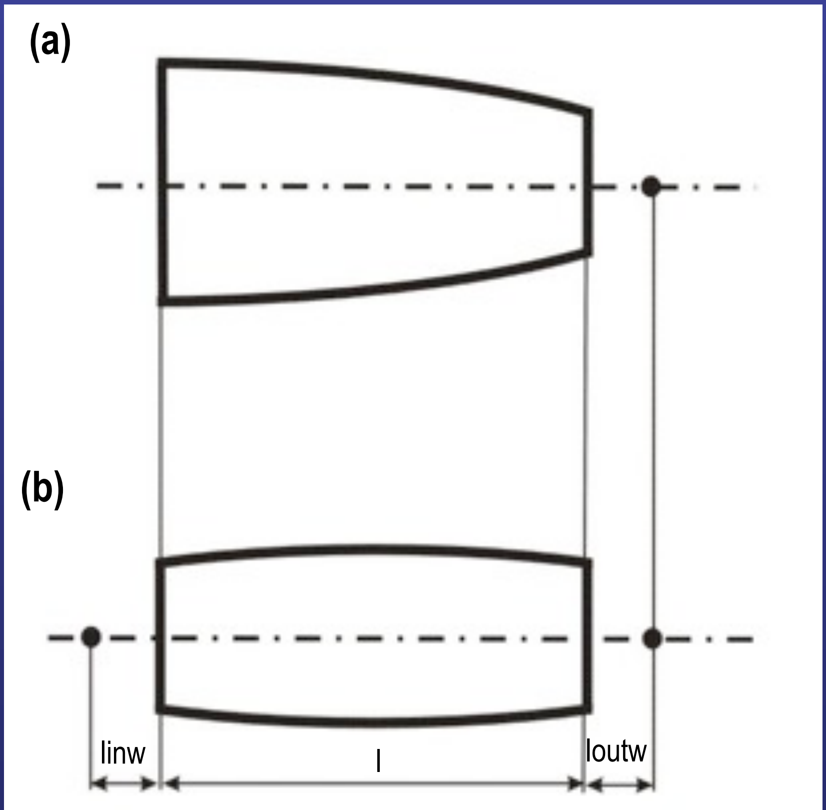
Compile and TRACE to have an overview of the instrument.

Run a simulation and notice the wavelength distr. before and after guide.

Task: Scan sa_pos between 0 and 1 m in 11 steps. Notice the effect on beam profiles and divergence.

1.4 Elliptic / parabolic Guides

Guide_tapering Component



Parameters for the parabolic (a) and elliptic (b) focusing guide in x-plane

```
COMPONENT cguide = Guide_tapering (
   w1 = 0.035, h1 = 0.012, linw = 0, loutw = 0.3,
   l=1.0, linh=0, louth = 0.3, option="parabolical",
   R0 = 0.995, Qcx = 0.0217, Qcy = 0.0217,
   alphax = 4.954, alphay = 4.954, W = 0.003,
   mx = 3, my = 3, segno = 20)
AT (0,0,1.5) RELATIVE arm1 ROTATED (0,0,0) RELATIVE arm1
```

```
COMPONENT cguide = Guide_tapering (
   w1 = 0.035, h1 = 0.012, linw = 0.3, loutw = 0.3,
   l=10.0, linh=0.3, louth = 0.3, option="elliptical",
   R0 = 0.995, Qcx = 0.0217, Qcy = 0.0217,
   alphax = 4.954, alphay = 4.954, W = 0.003,
   mx = 3, my = 3, segno = 100)
AT (0,0,1.5) RELATIVE arm1 ROTATED (0,0,0) RELATIVE arm1
```

```
COMPONENT cguide = Guide_tapering (
   w1 = 0.035, h1 = 0.012, linw = 0.3, loutw = 0.3,
   l=10.0, linh=0.3, louth = 0.3, option="file=input.dat",
   R0 = 0.995, Qcx = 0.0217, Qcy = 0.0217,
   alphax = 4.954, alphay = 4.954, W = 0.003,
   mx = 3, my = 3, segno = 100)
AT (0,0,1.5) RELATIVE arm1 ROTATED (0,0,0) RELATIVE arm1
```

1.4: Elliptic guide:

Open the instrumentfile Ex_1_4.instr given to you

Notice the smaller moderator surface, for optimal use of the elliptic guide

Notice the extra input parameter fp, for definition of the guide exit focal point.

Compile and TRACE to have an overview of the instrument.

Run a simulation and notice the wavelength distr. before and after guide. Compare with ballistic guide.

Task: At sa_pos fixed at 0.5 m, vary fp between 0 and 1 m in 11 steps. Notice the effect on beam profiles and divergence. Compare with parabolic guide (Ex_1_4a.instr).