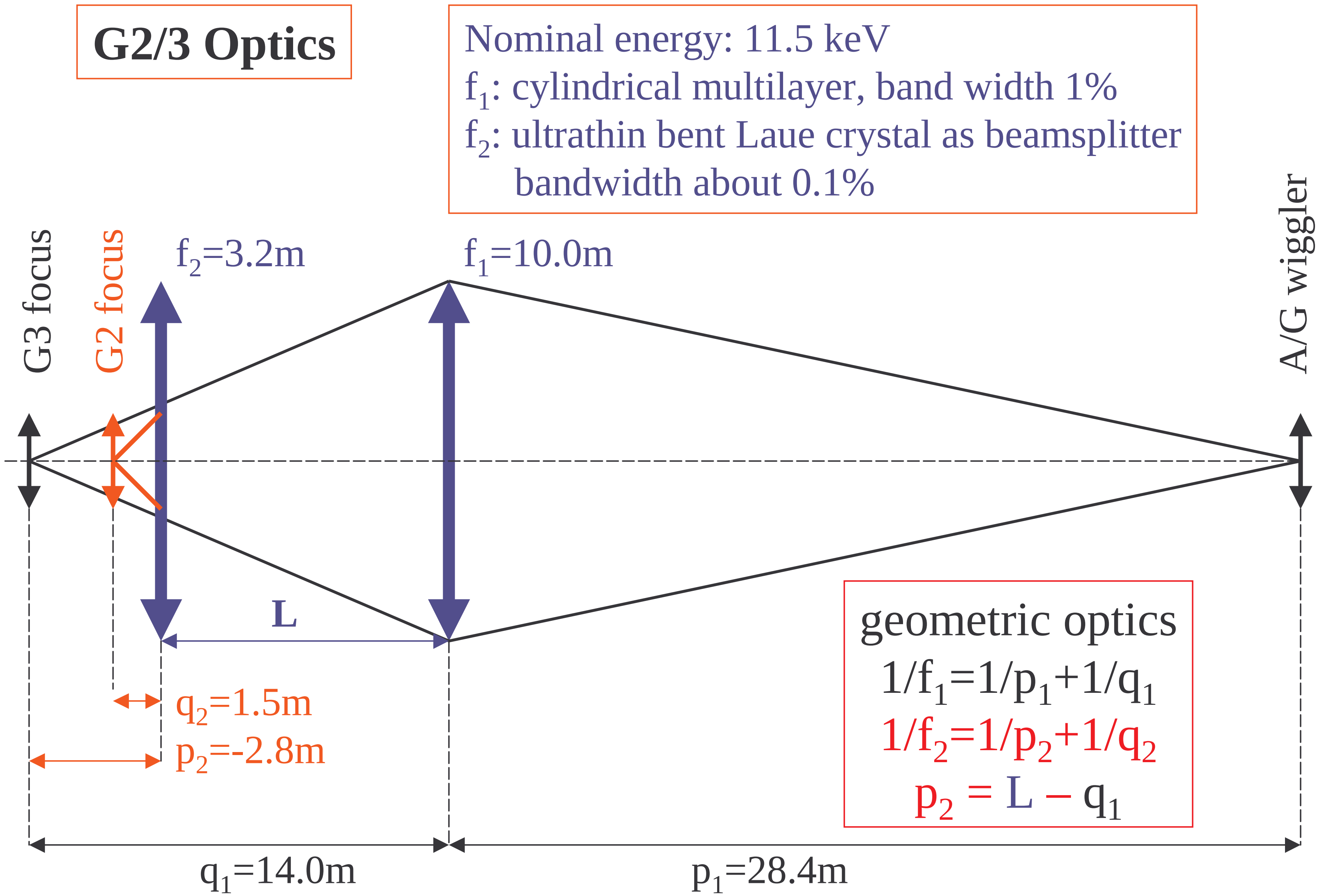
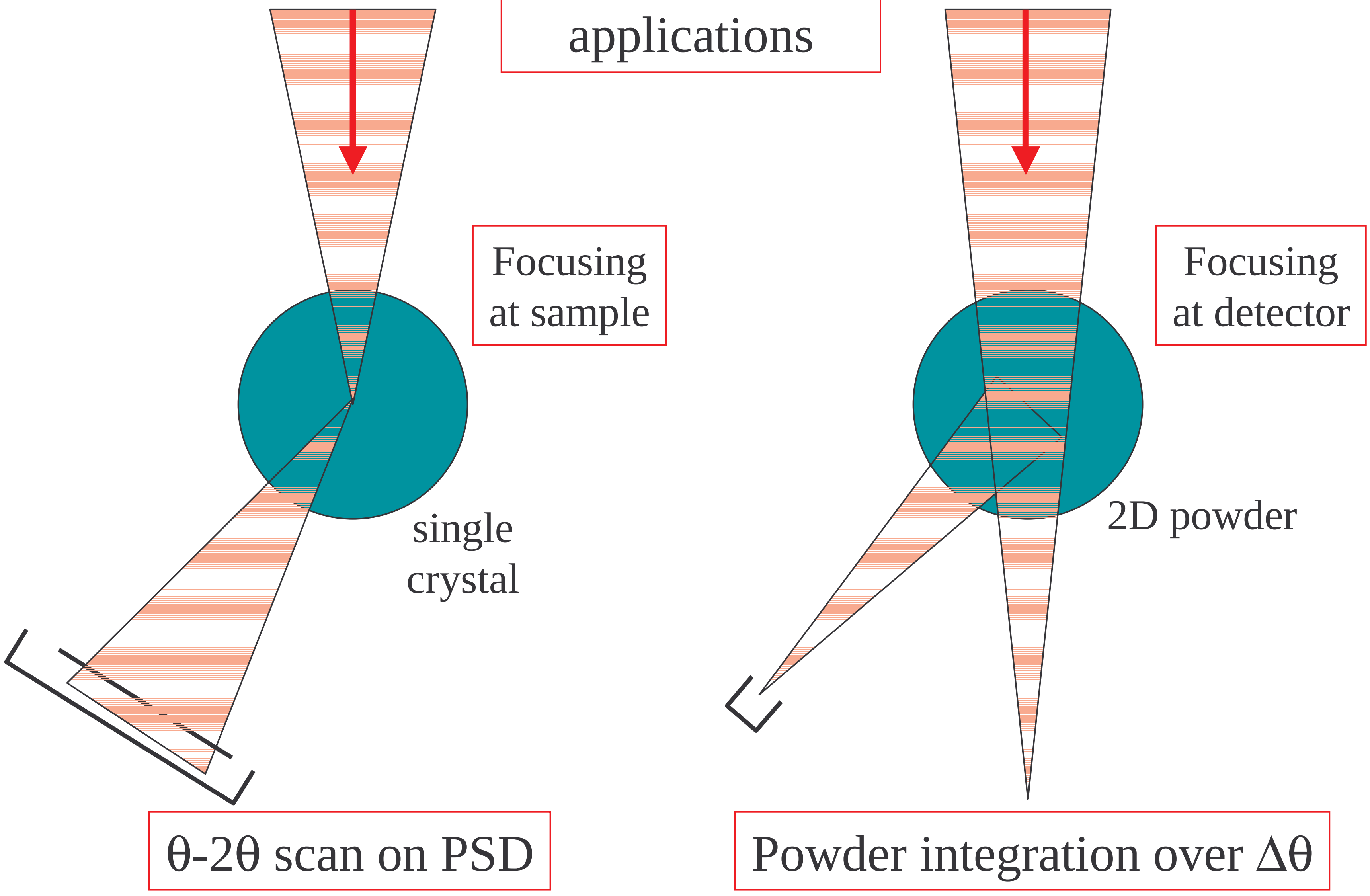


G2/3 Optics
Nominal energy: 11.5 keV
f_1: cylindrical multilayer, band width 1%
f_2: ultrathin bent Laue crystal as beamsplitter
bandwidth about 0.1%
G3 focus
G2 focus
f_2=3.2m
f_1=10.0m
A/G wiggler
L
q_2=1.5m
p_2=-2.8m
geometric optics
$1/f_1=1/p_1+1/q_1$
$1/f_2=1/p_2+1/q_2$
$p_2 = L - q_1$
q_1=14.0m
p_1=28.4m

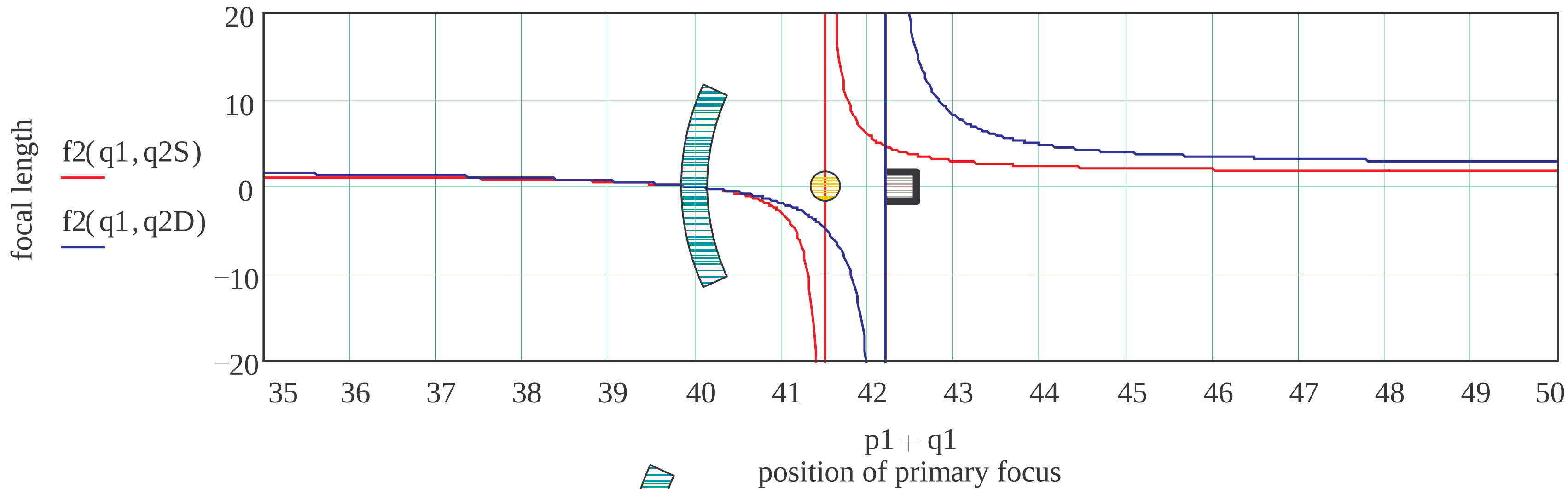
Focussed beams: applications

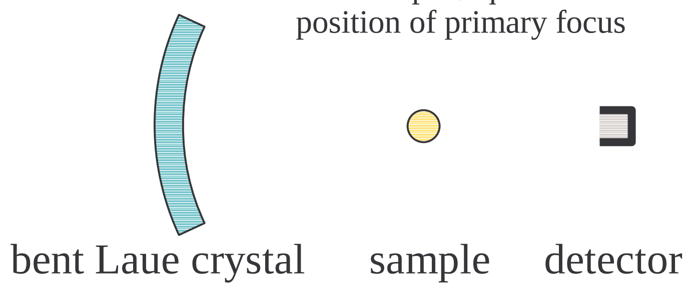


Fixed curvature focussing multilayer

→ position of main focal spot p1+q1 depends on the beam energy

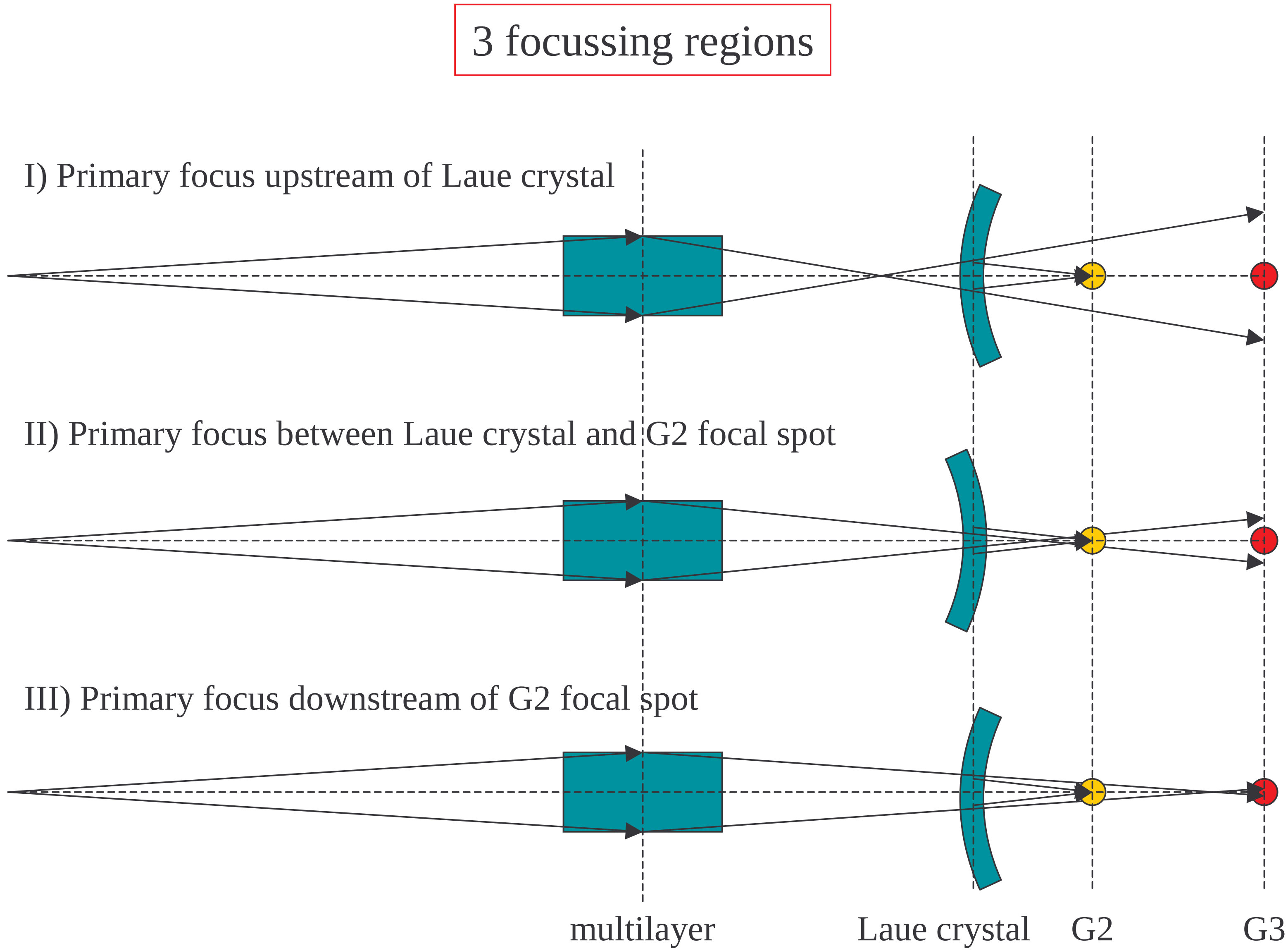
→ focusing singularities for Laue bender



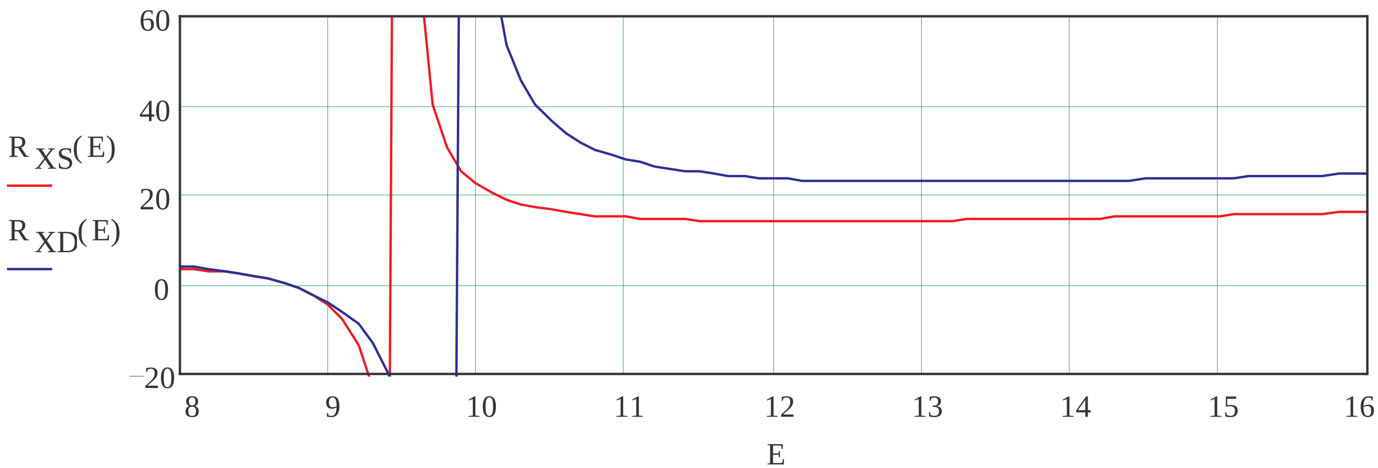


Singularities:

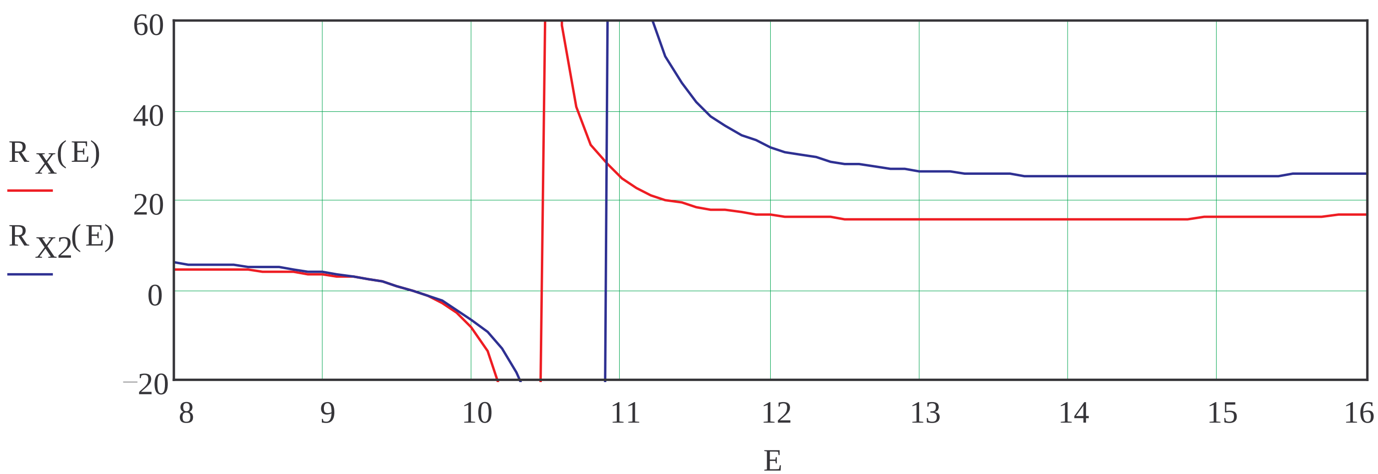
- primary focus at Laue crystal: f2 = 0 (infinitely strong lens)
- primary focus at sample (see red curve) : f2 = ∞ (no focussing / flat crystal)
- primary focus at detector (see blue curve) : f2 = ∞ (no focussing / flat crystal)


3 focussing regions
I) Primary focus upstream of Laue crystal
II) Primary focus between Laue crystal and G2 focal spot
III) Primary focus downstream of G2 focal spot
multilayer
Laue crystal
G2
G3

Optimizing the nominal beam energy

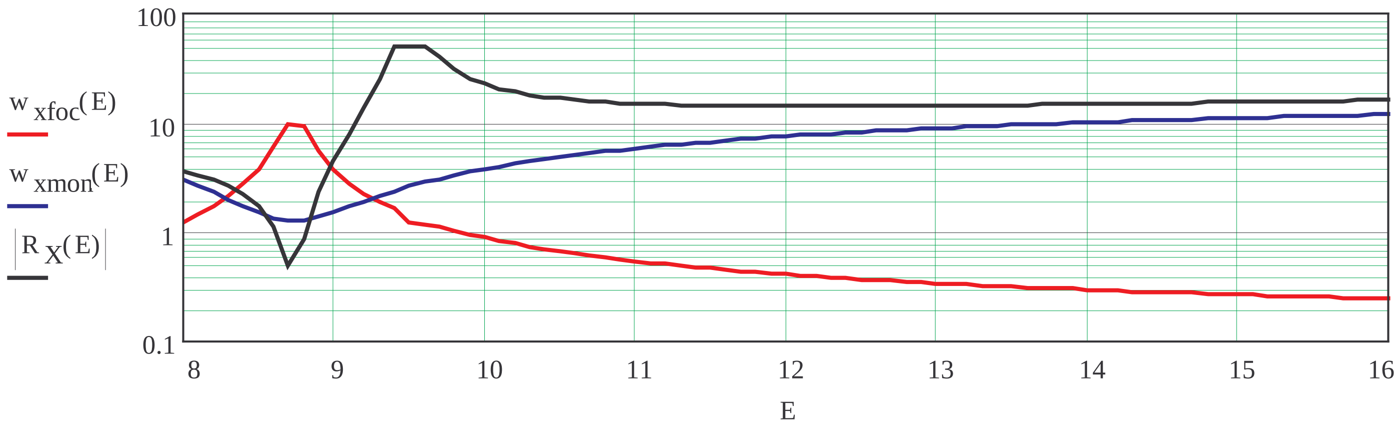


nominal beam energy: 10.5 keV

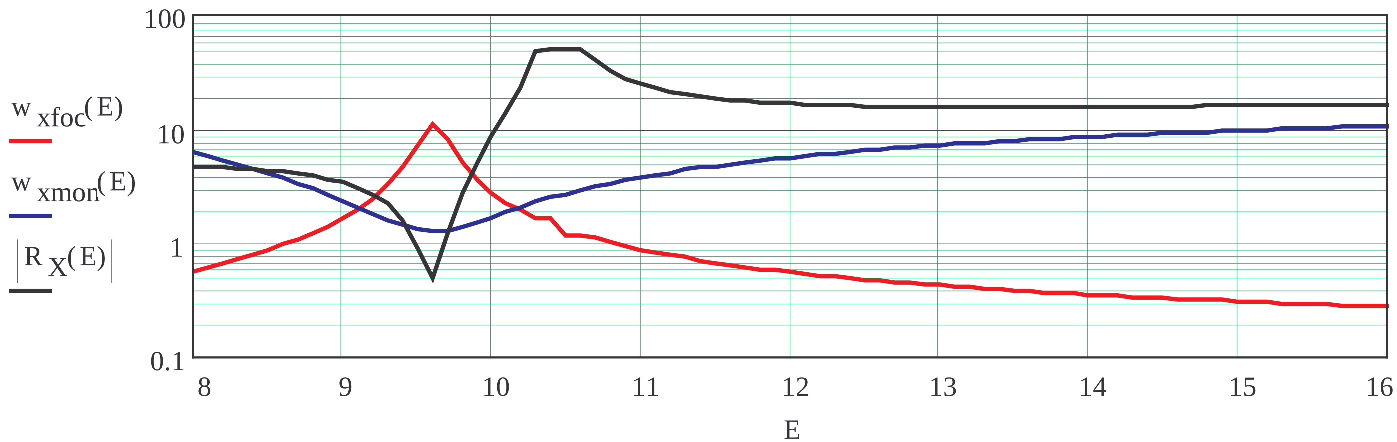


nominal beam energy: 11.5 keV

Optimizing the nominal beam energy II



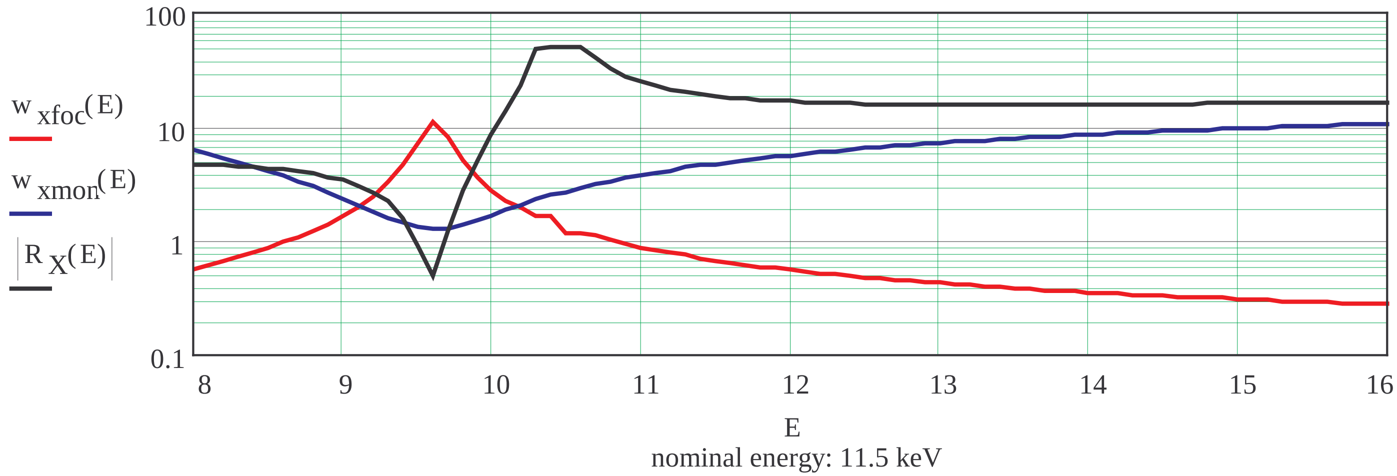
nominal energy: 10.5 keV



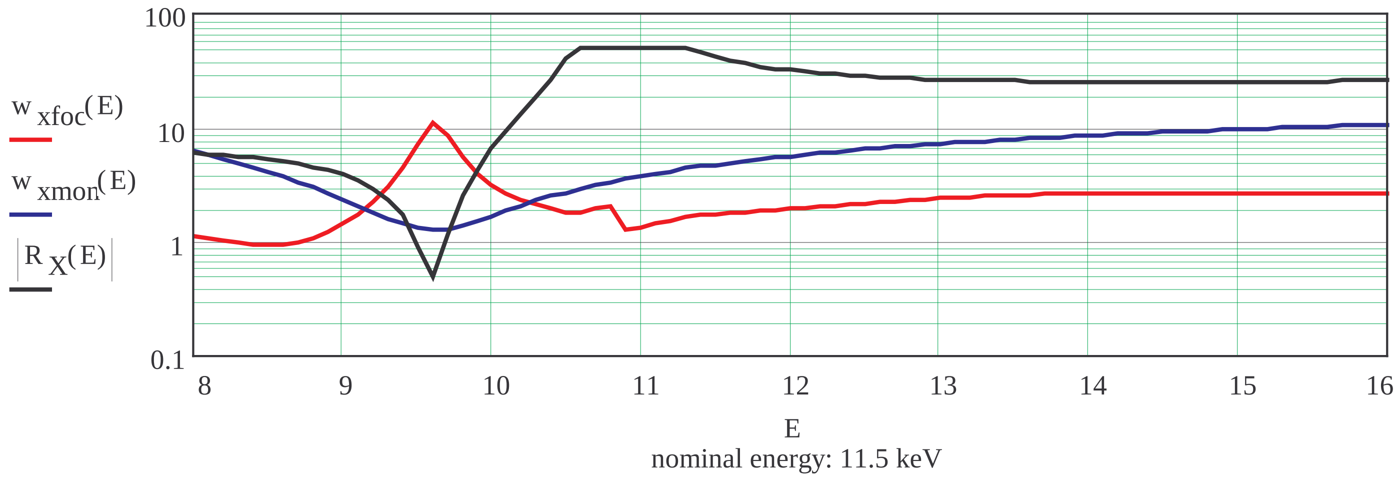
nominal energy: 11.5 keV

w_{xfoc}: width at focus(=sample) (mm), w_{xmon}: width at mono (mm), R_X: bending radius (m)
condition for bending radius: $0.5m < |R_X| < 50m$

Focus at sample



Focus at detector



Conclusions

- worst G2 focal spot for G3 focus at mono
- focusing at sample and detector essentially both determined by worst focal spot
- focal sizes at the sample can be below 1 mm and at the detector below 5 mm
- we need a careful list of absorption edges to be avoided and to be reached for G2 & G3
- the original nominal energy of 11.5 keV seems to work quite well, if unfavorable focussing between 9 and 10 keV is acceptible
- all three focusing regimes found may have to be exploited