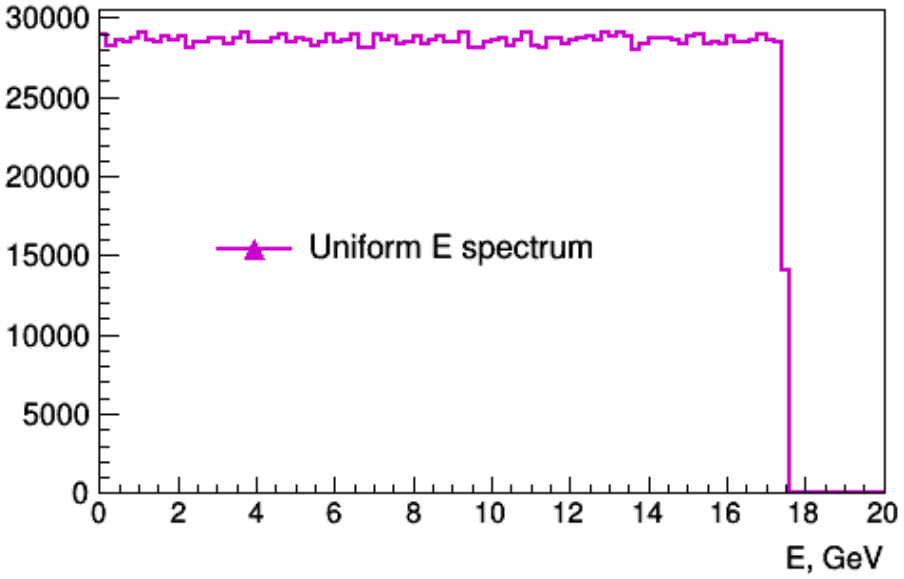
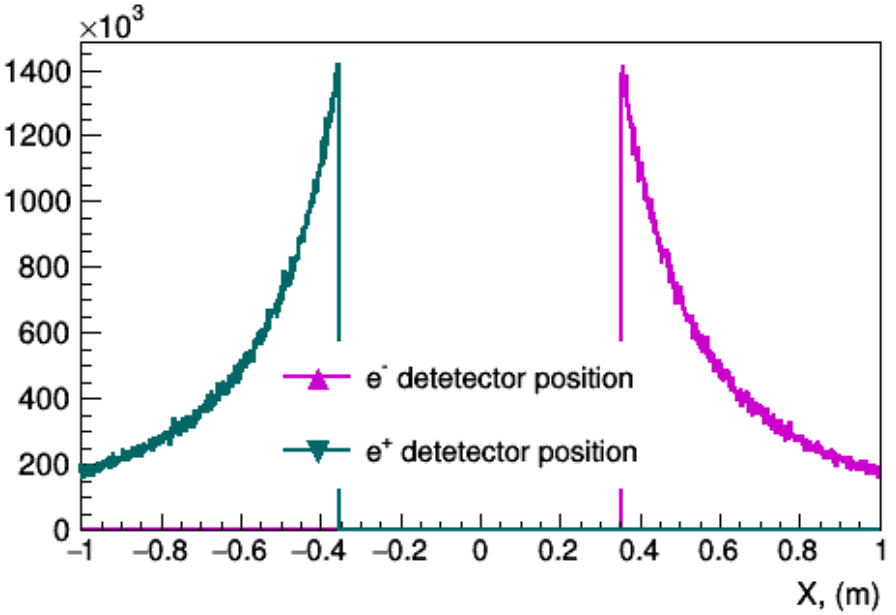
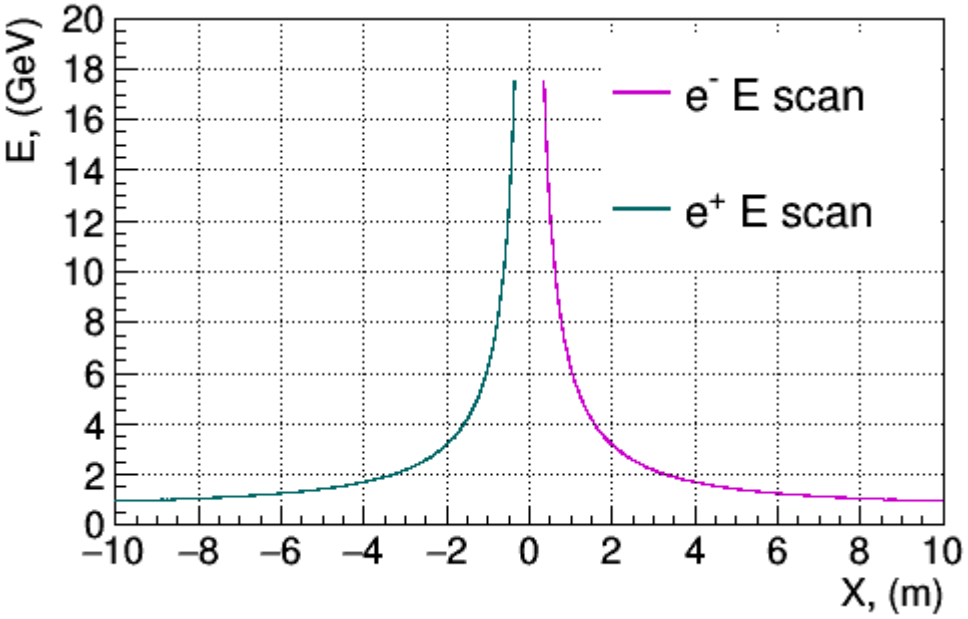
Position of e^-, e^+ in detector





Position of the particles can be determined using energy scan.

Drift_L	1.0	8.0
B_length	1.08	
B_field	2.24	



Position of electron with E = 1 GeV : 8.89636 m

Position of positron with E = 1 GeV : -8.89948 m

Position for E = 17.5 GeV : ±35.42 cm

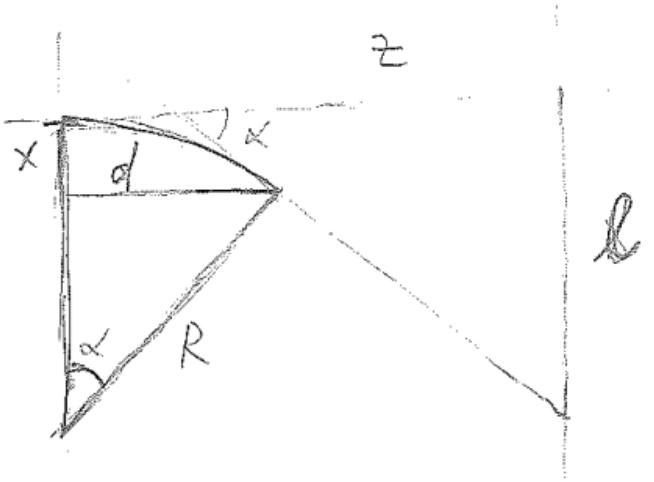
```
(%i4)  R: A*p/H;
       tg: d/sqrt(R^2-d^2);
       x: R-sqrt(R^2-d^2);
       L: (z-d)*tg+x;
```

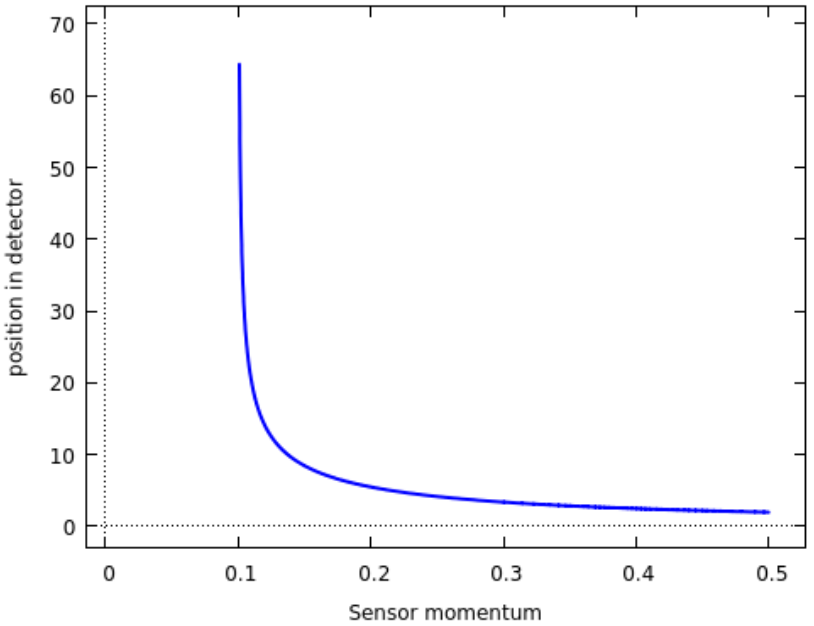
$$(R)\quad \frac{A\,p}{H}$$

$$(tg)\quad \frac{d}{\sqrt{\frac{A^2\,p^2}{H^2}-d^2}}$$

$$(x)\quad \frac{A\,p}{H}-\sqrt{\frac{A^2\,p^2}{H^2}-d^2}$$

$$(L)\quad \frac{d\,(z-d)}{\sqrt{\frac{A^2\,p^2}{H^2}-d^2}}-\sqrt{\frac{A^2\,p^2}{H^2}-d^2}+\frac{A\,p}{H}$$





Magnet Geometry

```
(%i3)  tg: d/sqrt(R^2-d^2);
       x: R-sqrt(R^2-d^2);
       L: (z-d)*tg+x;
```

$$(tg)\quad \frac{d}{\sqrt{R^2-d^2}}$$

$$(x)\quad R-\sqrt{R^2-d^2}$$

$$(L)\quad \frac{d\,(z-d)}{\sqrt{R^2-d^2}}-\sqrt{R^2-d^2}+R$$

```
(%i4)  L1: (L-R)^2;
```

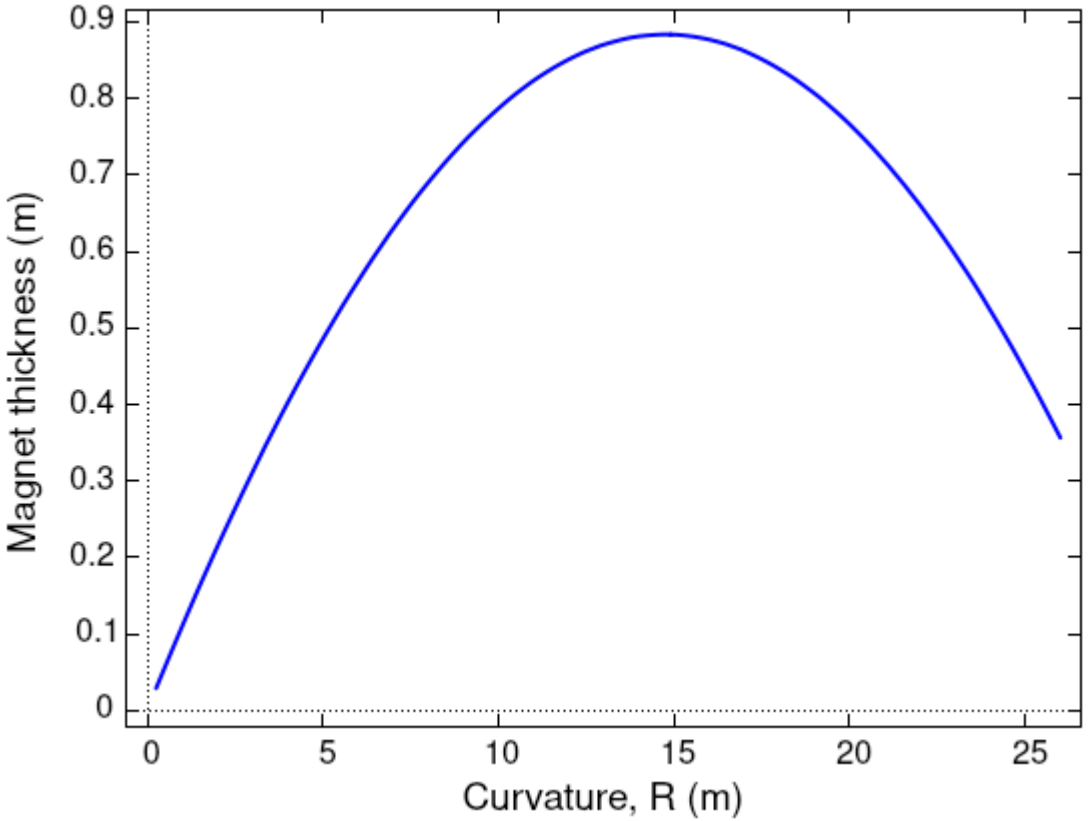
$$(L1)\quad \left(\frac{d\,(z-d)}{\sqrt{R^2-d^2}}-\sqrt{R^2-d^2}\right)^2$$

```
(%i5)  R1: (a+b*R-R)^2;
```

$$(R1)\quad (R\,b+a-R)^2$$

```
(%i6)  L2: L1-R1;
```

$$(L2)\quad \left(\frac{d\,(z-d)}{\sqrt{R^2-d^2}}-\sqrt{R^2-d^2}\right)^2-(R\,b+a-R)^2$$




```
(%i7)  L3: ratsimp(L2*(d^2-R^2));
```

$$(L3)\quad -d^2\,z^2+2\,R^2\,d\,z+\left(-R^2\,b^2+\left(2\,R^2-2\,R\,a\right)\,b-a^2+2\,R\,a-R^2\right)\,d^2+R^4\,b^2+\left(2\,R^3\,a-2\,R^4\right)\,b+R^2\,a^2-2\,R^3\,a$$

```
(%i8)  G: solve(L3, d);
```

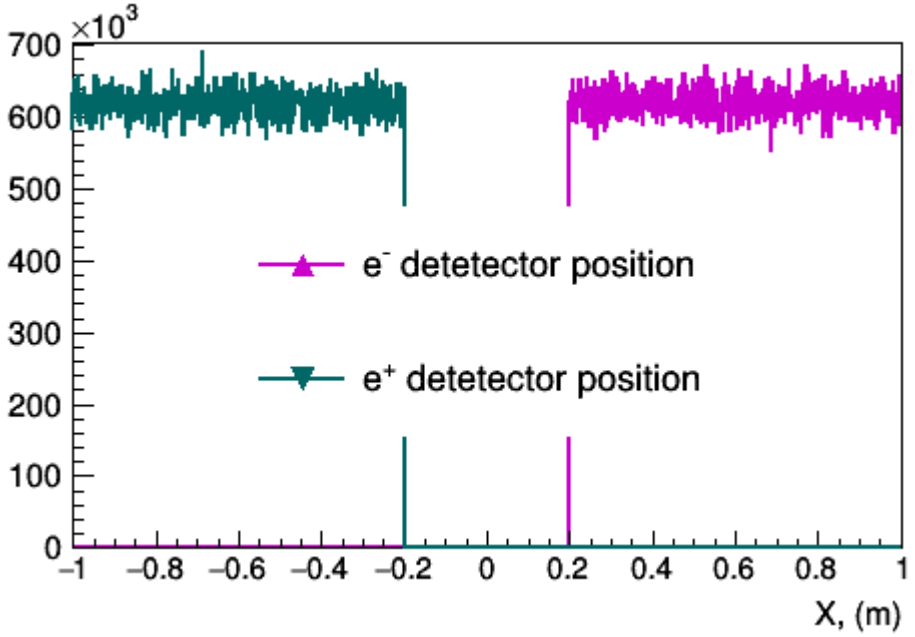
$$(G)\quad \left[d=-\frac{\left(R^2\,b+R\,a-R^2\right)\,\sqrt{z^2+R^2\,b^2+\left(2\,R\,a-2\,R^2\right)\,b+a^2-2\,R\,a}-R^2\,z}{z^2+R^2\,b^2+\left(2\,R\,a-2\,R^2\right)\,b+a^2-2\,R\,a+R^2},\ d=\frac{\left(R^2\,b+R\,a-R^2\right)\,\sqrt{z^2+R^2\,b^2+\left(2\,R\,a-2\,R^2\right)\,b+a^2-2\,R\,a}+R^2\,z}{z^2+R^2\,b^2+\left(2\,R\,a-2\,R^2\right)\,b+a^2-2\,R\,a+R^2}\right]$$

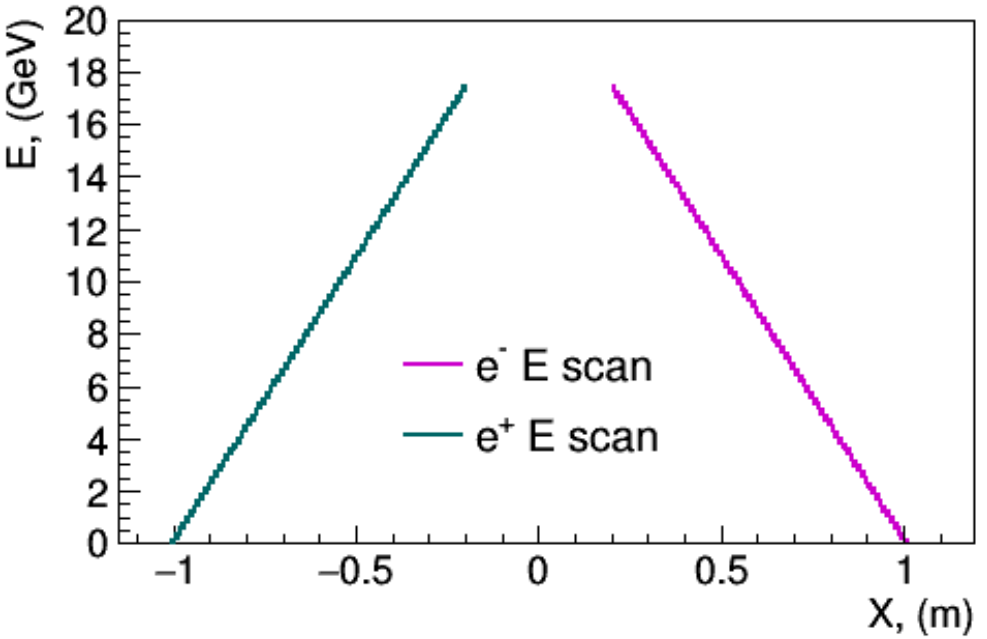
equals a+b*R. a and b are constants defined by R_min and R_max and X_min and X_max (not here, but in principle)

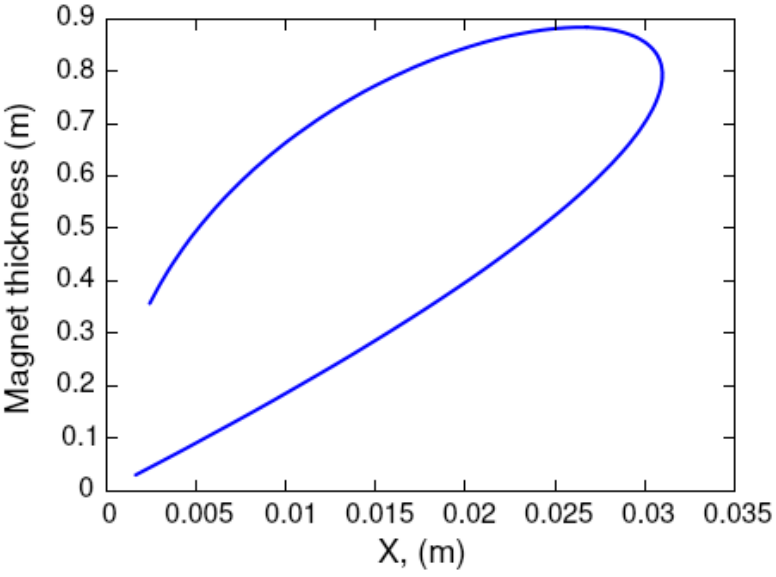
```
b = (X_min-X_max)/(R_max-R_min); a = X_min - b*R_max;
```

```
z: 9;
b: (0.1-1)/(26.06-0.26);
a: 0.1-b*26.6;
```

Magnet with cut







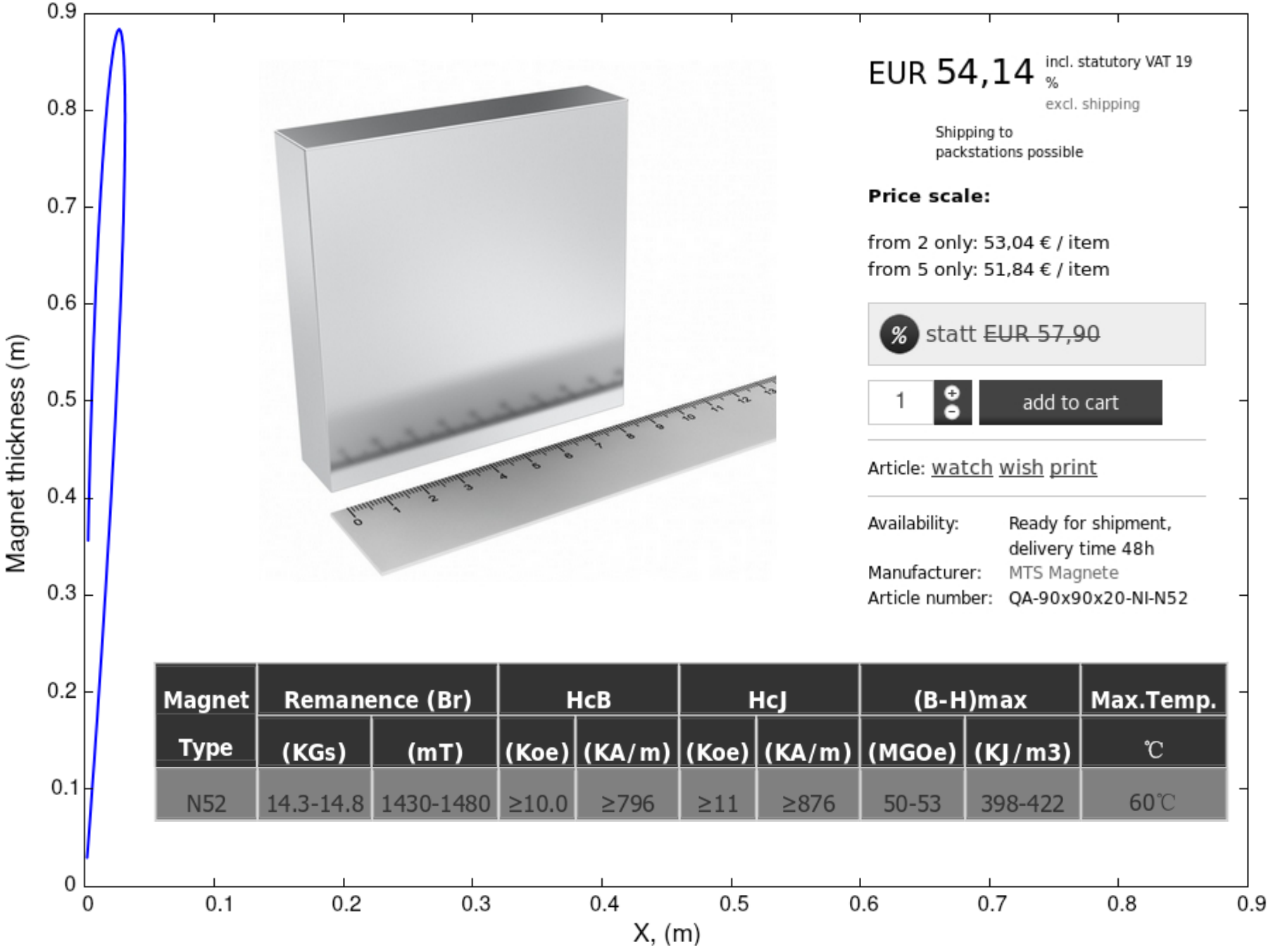
(%i10) D: subst(G1,d);

(D)
$$\frac{\left(R^2 b+R a-R^2\right)\sqrt{z^2+R^2 b^2+\left(2 R a-2 R^2\right) b+a^2-2 R a}+R^2 z}{z^2+R^2 b^2+\left(2 R a-2 R^2\right) b+a^2-2 R a+R^2}$$

(%i11) X: subst(G1,x);

(X)
$$R-\sqrt{R^2-\frac{\left(\left(R^2 b+R a-R^2\right)\sqrt{z^2+R^2 b^2+\left(2 R a-2 R^2\right) b+a^2-2 R a}+R^2 z\right)^2}{\left(z^2+R^2 b^2+\left(2 R a-2 R^2\right) b+a^2-2 R a+R^2\right)^2}}$$

Equal scale on x,y



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1 add to cart

Article: watch wish print

Availability: Ready for shipment, delivery time 48h
Manufacturer: MTS Magnete
Article number: QA-90x90x20-NI-N52

Magnet	Remanence (Br)		HcB		HcJ		(B-H)max		Max.Temp.
Type	(KGs)	(mT)	(Koe)	(KA/m)	(Koe)	(KA/m)	(MGOe)	(KJ/m3)	℃
N52	14.3-14.8	1430-1480	≥10.0	≥796	≥11	≥876	50-53	398-422	60℃