VIENNA UNIVERSITY OF TECHNOLOGY

FACULTY OF PHYSICS

LABORATORY III

Laboratory Report

Röntgen

Authors:
Raul Wagner
Martin Kronberger
Group 301

Supervisor:
Someone

conducted on:
21 May 2025
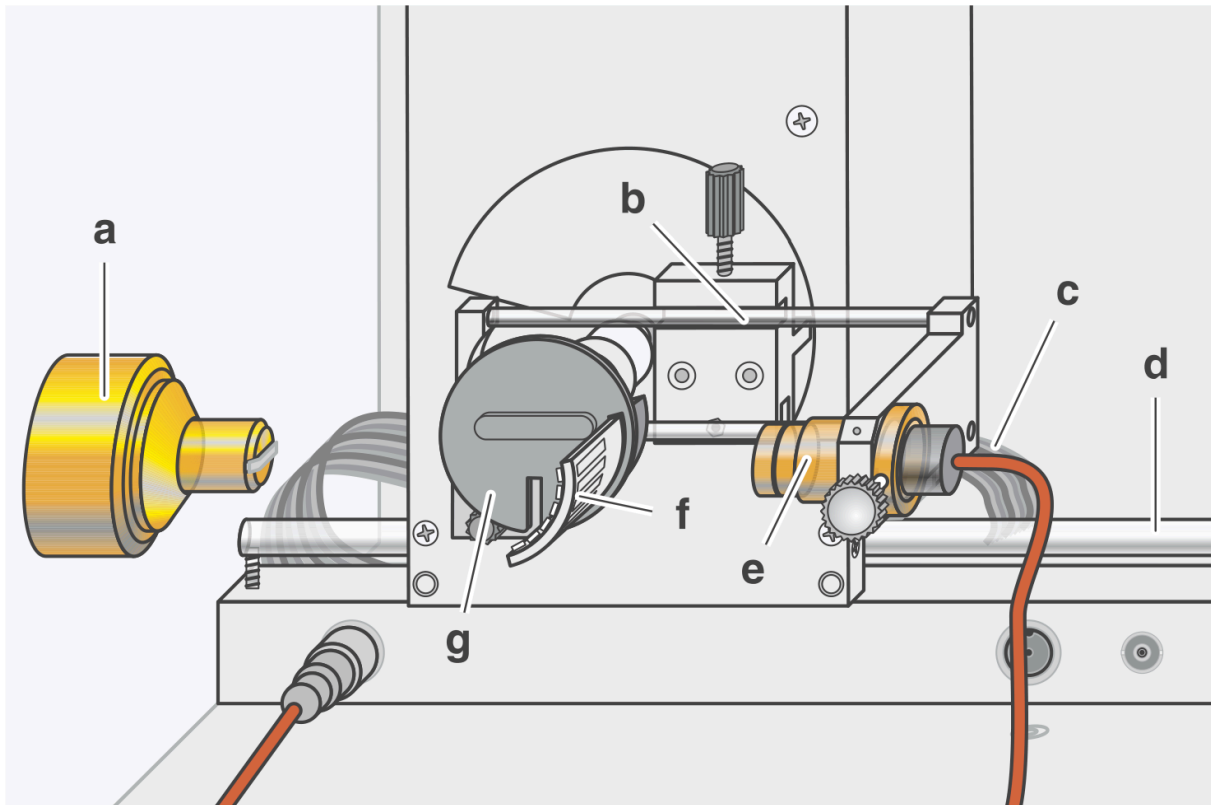
1 Measurement Setup and Preparations

Setup

Figure 1: Measurement Setup with following compenents: (a) collimator mount, (b) sensor holder, (c) flat ribbon cable, (d) goniometer guide rods, (e) sensor mount, (f) insertion edge of absorber set l, and (g) goniometer target holder.

Preparations

- Carefully align the guide rod while inserting the collimator into the collimator mount (a).
- Secure the goniometer onto the guide rods (d) before connecting the flat ribbon cable (c) for control.
- After removing the protective cap, install the window counter tube into the sensor mount (e) and plug its cable into the GM-tube socket in the experimental area.
- Remove the goniometer's target holder (g) to lift off the target table.
- Slide the insertion edge of absorber set l (f) into the quarter-circle groove of the target holder until it clicks into place.
- Swap out the sensor holder with X-ray energy detector for the holder equipped with the window counter tube.
- Reinstall the target holder carrying absorber set l.
- Press the "Zero" button to set target and sensor to their null positions.
- Verify (and adjust if needed) the zero position of both the blank aperture in the absorber set and the sensor (see "Setting the measurement zero position" in the X-ray manual).
- Finally, slide the goniometer to position the collimator at 5 cm from the blank aperture, then slide the sensor holder (b) to set 5 cm between aperture and sensor slit. = Dependence of attenuation on absorber thickness

2 Dependence of attenuation on absorber thickness

2.1 Measurement without a zirconium filter

d / mm	R / s⁻¹
0	1618
0.5	787.4
1	403.5
1.5	226.4
2	49.1
2.5	30.55
3	16.11

Table 1: Some Caption

2.2 Measurement with a zirconium filter

d / mm	R / s⁻¹
0	969.4
0.5	426.1
1	197.3
1.5	84.29
2	40.51
2.5	19.48
3	9.52

Table 2: Some caption
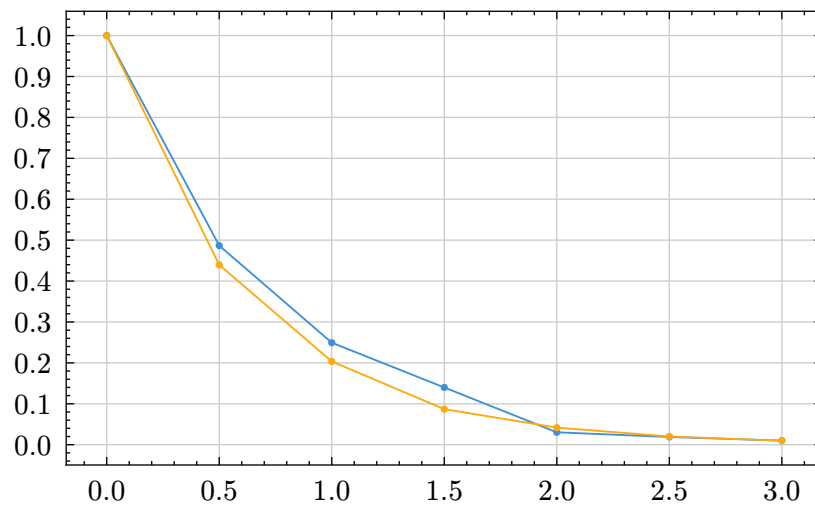
2.2.1 Measurement Results

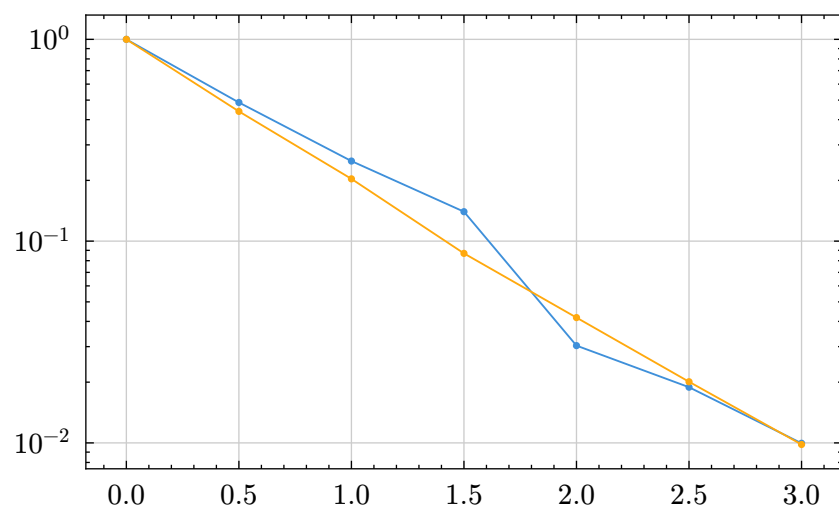Figure 2: Some Caption

Laboratory Work III - Röntgen

Figure 3: Some Caption

3 Dependence of attenuation on the absorber material

3.1 Measurement without zirconium filter

Absorber	Z	I / mA	Δt / s	R / s^{-1}	T	μ / cm^{-1}
leer	0	0.02	30	1841	1	0
C	6	0.02	30	1801	0.978	7
Al	13	0.02	30	1164	0.632	153
Fe	26	1	300	93.3	0.051	994
Cu	29	1	300	16.63	0.009	1569
Zr	40	1	300	194.3	0.106	750
Ag	47	1	300	106	0.058	952

Table 3: Some caption

3.2 Measurement with a zirconium filter

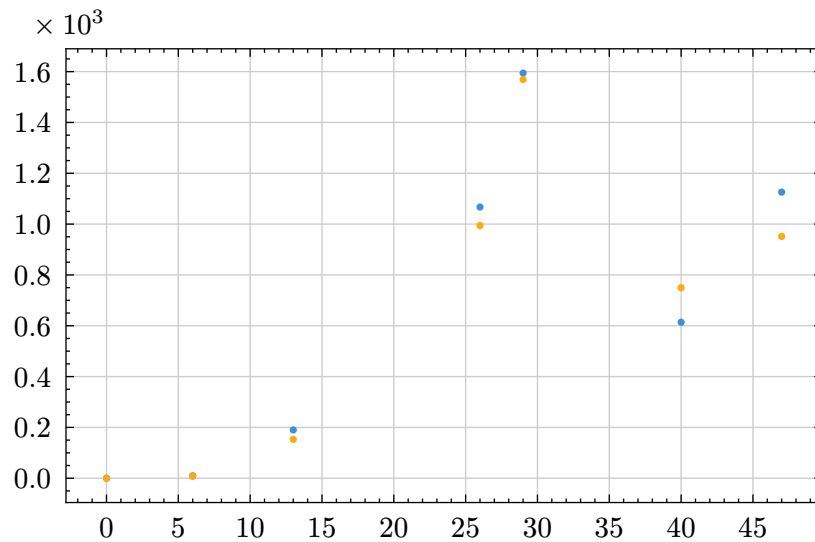| Absorber	Z	I / mA	Δt / s	R / s^{-1}	T	μ / cm^{-1}
leer	0	0.02	30	718.3	1	0
C	6	0.02	30	698.4	0.972	9
Al	13	0.02	30	406.1	0.565	190
Fe	26	1	300	29.24	0.041	1067
Cu	29	1	300	6.016	0.008	1594
Zr	40	1	300	113.9	0.159	614
Ag	47	1	300	24.52	0.034	1126

Table 4: Some caption

Figure 4: Some caption

3.3 Measurement of the Zeroeffect