

Auswertung

July 7, 2024

0.1 Photostrom

```
[1]: using LaTeXStrings
      using LinearAlgebra
      using LsqFit
      using Measurements
      using Plots
      using Statistics

[2]: #gemessene Spannungen
      U_blau = [1.486, 1.067, 0.807, 0.655, 0.440, 0.338]
      U_grün = [0.536, 0.357, 0.265, 0.190, 0.126, 0.090];

[3]: #Relative Intensität
      T_blau = [68., 48., 33., 28., 20., 14.]
      T_grün = [67., 46., 31., 23., 16., 11.]
      ΔT = 1;

[4]: # berechne Photostrom
      R=10000
      I_blau = U_blau ./ R
      I_grün = U_grün ./ R;

[5]: ΔI = 0.005 / R

[5]: 5.0e-7

[6]: I_Blau = measurement.(I_blau, ΔI)
      I_Grün = measurement.(I_grün, ΔI)
      T_Blau = measurement.(T_blau, ΔT)
      T_Grün = measurement.(T_grün, ΔT);

[7]: # Funktion zur Berechnung der linearen Regression
      function fit(x, y)
          X = [ones(length(x)) x]
          coef = X \ y
          return coef[1], coef[2]
      end
```

[7]: fit (generic function with 1 method)

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[8]: rounded_string(value) = rpad(round(value, digits=3),  
    ↪length(string(round(value)))) +2 , "0")
```

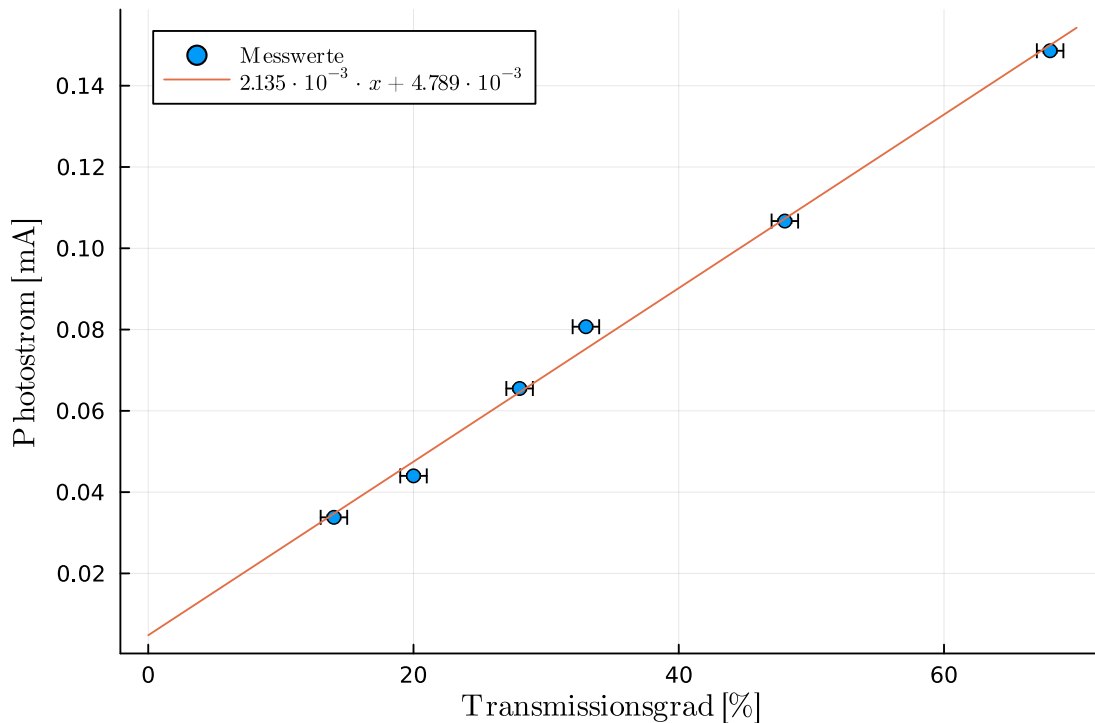
[8]: rounded_string (generic function with 1 method)

```
[9]: # Berechnung der linearen Regression  
a, b = fit(T_blau, I_blau .* 1e3)  
  
@show a  
@show b  
  
# Erstellen der Fitlinie  
f(x) = a .+ b .* x  
a_rounded = rounded_string(a*1e3)  
b_rounded = rounded_string(b*1e3)  
  
blau = scatter(T_blau, I_blau.*1e3, xerr=1, yerr=ΔI .* 10-3,  
    label=L"\mathrm{Messwerte}", xlabel=L"\mathrm{Transmissionsgrad}\ [\%]",  
    ↪ylabel=L"\mathrm{Photostrom}\ [\mathrm{mA}])  
plot!(0:70, f, label="$$b_rounded\\\cdot 10^{-3}\\\cdot x +  
    ↪a_rounded\\\cdot 10^{-3}$$", linewidth = 1)
```

a = 0.0047886687463114435

b = 0.002135393305792092

[9]:



```
savefig(blau, "../../media/B1.4/Photostrom_blau.pdf");
```

```
[10]: # Berechnung der linearen Regression
a, b = fit(T_grün, I_grün .* 1e3)

@show a
@show b

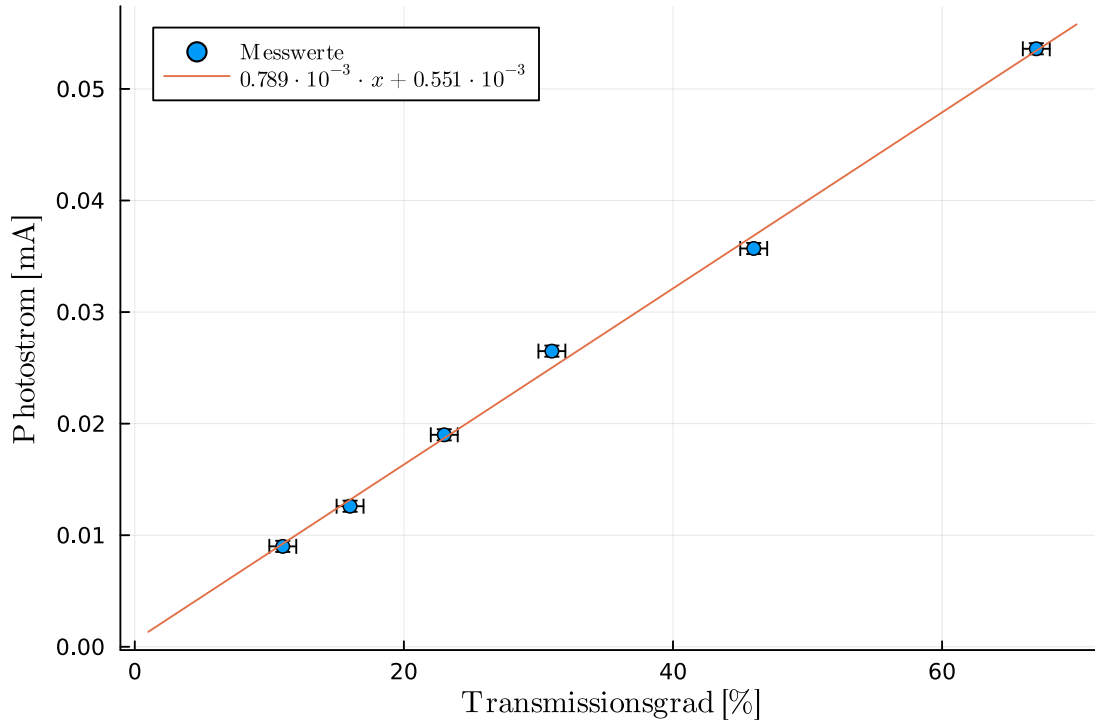
# Erstellen der Fitlinie
f(x) = a .+ b .* x
a_rounded = rounded_string(a*1e3)
b_rounded = rounded_string(b*1e3)

gruen = scatter(T_grün, I_grün.*1e3, xerr=1, yerr=ΔI .* 103,
    label=L"\mathrm{Messwerte}", xlabel=L"\mathrm{Transmissionsgrad}\ [\%]",
    ylabel=L"\mathrm{Photostrom}\ [\mathrm{mA}])
plot!(1:70, f, label="$$b_rounded\cdot10^{-3}\cdot x +
    a_rounded\cdot10^{-3}$$", linewidth = 1)
```

```
a = 0.000551364049712036
```

```
b = 0.0007891330706274626
```

[10]:



```
savefig(gruen, “../media/B1.4/Photostrom_gruen.pdf”);
```