Vorlesung und Übung

Medien:

www.opve.uni-freiburg.de/SS13

Passwort: studentSS13; Passwort: solidstateSS13

Übungen:

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Rahel Klimpel	2902145
Lisa Eberle	3111913
Fabian Ruf	3101293
Florian Heß	3114036
Stephan Dierle	3110705
Andreus Wituschek	2901506
Gertrud Langenfeld	2959555
Fabian Zummerer	
Clemens Blank	3344530
Dominik Schomas	3156481
Steffen Ludwig	3108807

Do 14-16 Seminarraum 3	
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Hauke Lehmann	3300509
Ruben Sachs	3302038
Dominik Brändle	??????
Jonas Hiestand	3308047
Julia Ostertag	3103868
Stefanie Ade	1400426
Pascal Schade	3304761
Yannick Fautz	3308332
Jens Franken	3339757
Timea Sebesi	3323904
Christian Kubran	3104861
Dominik Hägete	3013689
Oleg Orlov	3316670

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Oliver Boness	3338414
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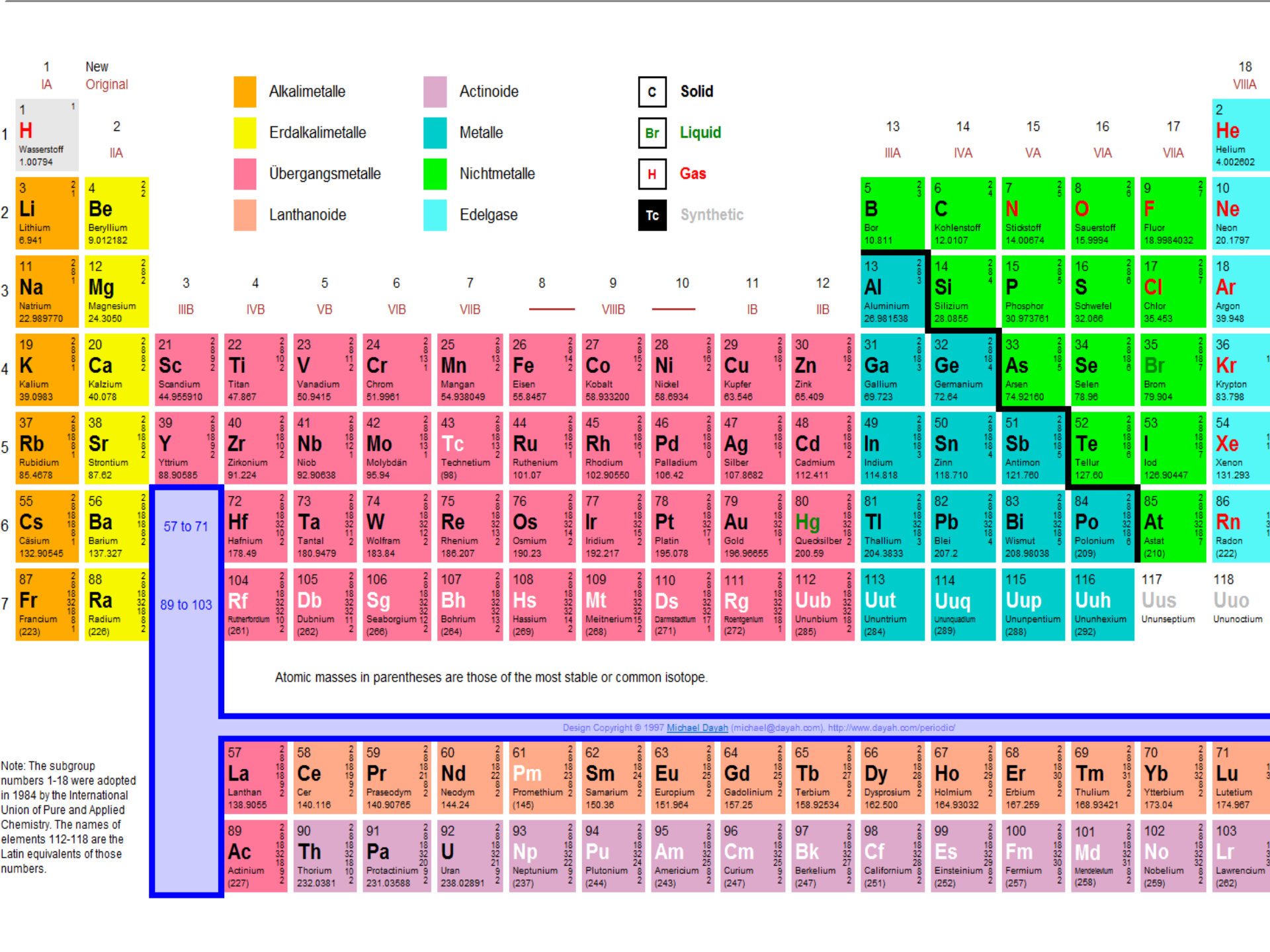
Tobias Riehle	3319997
Christoph Klieber	3301035
Markus Herm	3314845
Johannes Hauptmann	3339791
Martin Maletz	3155535
Marc Heckl	3117375
Willi Waibel	2902452
Simon Klotz	3304125
Kristian Klumpp	3302776

Prüfung: 20.07.2013


Alkalimetalle
Erdalkalimetalle
Übergangsmetalle
Lanthanoide
Actinoide
Metalle
Nichtmetalle
Edelgase
C Solid
Br Liquid
H Gas
Tc Synthetic
1 IA
New
Original
2 IIA
3 IIIB
4 IVB
5 VB
6 VIB
7 VIIB
8
9 VIIIB
10
11 IB
12 IIB
13 IIIA
14 IVA
15 VA
16 VIA
17 VIIA
18 VIIIA
1 H Wasserstoff 1.00794
2 He Helium 4.002602
3 Li Lithium 6.941
4 Be Beryllium 9.012182
5 B Bor 10.811
6 C Kohlenstoff 12.0107
7 N Stickstoff 14.00674
8 O Sauerstoff 15.9994
9 F Fluor 18.9984032
10 Ne Neon 20.1797
11 Na Natrium 22.989770
12 Mg Magnesium 24.3050
13 Al Aluminium 26.981538
14 Si Silizium 28.0855
15 P Phosphor 30.973761
16 S Schwefel 32.066
17 Cl Chlor 35.453
18 Ar Argon 39.948
19 K Kalium 39.0983
20 Ca Kalzium 40.078
21 Sc Scandium 44.955910
22 Ti Titan 47.867
23 V Vanadium 50.9415
24 Cr Chrom 51.9961
25 Mn Mangan 54.938049
26 Fe Eisen 55.8457
27 Co Kobalt 58.933200
28 Ni Nickel 58.6934
29 Cu Kupfer 63.546
30 Zn Zink 65.409
31 Ga Gallium 69.723
32 Ge Germanium 72.64
33 As Arsen 74.92160
34 Se Selen 78.96
35 Br Brom 79.904
36 Kr Krypton 83.798
37 Rb Rubidium 85.4678
38 Sr Strontium 87.62
39 Y Yttrium 88.90585
40 Zr Zirkonium 91.224
41 Nb Niob 92.90638
42 Mo Molybdän 95.94
43 Tc Technetium (98)
44 Ru Ruthenium 101.07
45 Rh Rhodium 102.90550
46 Pd Palladium 106.42
47 Ag Silber 107.8682
48 Cd Cadmium 112.411
49 In Indium 114.818
50 Sn Zinn 118.710
51 Sb Antimon 121.760
52 Te Tellur 127.60
53 I Iod 126.90447
54 Xe Xenon 131.293
55 Cs Cäsium 132.90545
56 Ba Barium 137.327
57 to 71
72 Hf Hafnium 178.49
73 Ta Tantal 180.9479
74 W Wolfram 183.84
75 Re Rhenium 186.207
76 Os Osmium 190.23
77 Ir Iridium 192.217
78 Pt Platin 195.078
79 Au Gold 196.96655
80 Hg Quecksilber 200.59
81 Tl Thallium 204.3833
82 Pb Blei 207.2
83 Bi Wismut 208.98038
84 Po Polonium (209)
85 At Astat (210)
86 Rn Radon (222)
87 Fr Francium (223)
88 Ra Radium (226)
89 to 103
104 Rf Rutherfordium (261)
105 Db Dubnium (262)
106 Sg Seaborgium (266)
107 Bh Bohrium (264)
108 Hs Hassium (269)
109 Mt Meitnerium (268)
110 Ds Darmstadtium (271)
111 Rg Roentgenium (272)
112 Uub Ununbium (285)
113 Uut Ununtrium (284)
114 Uuq Ununquadium (289)
115 Uup Ununpentium (288)
116 Uuh Ununhexium (292)
117 Uus Ununseptium
118 Uuo Ununoctium
Atomic masses in parentheses are those of the most stable or common isotope.
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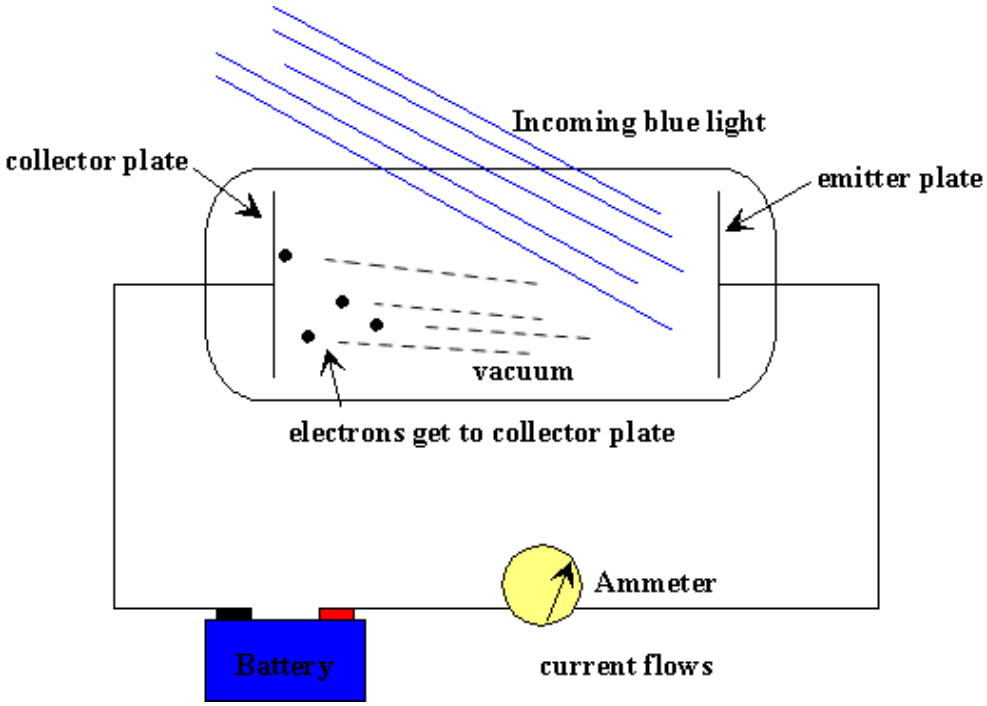
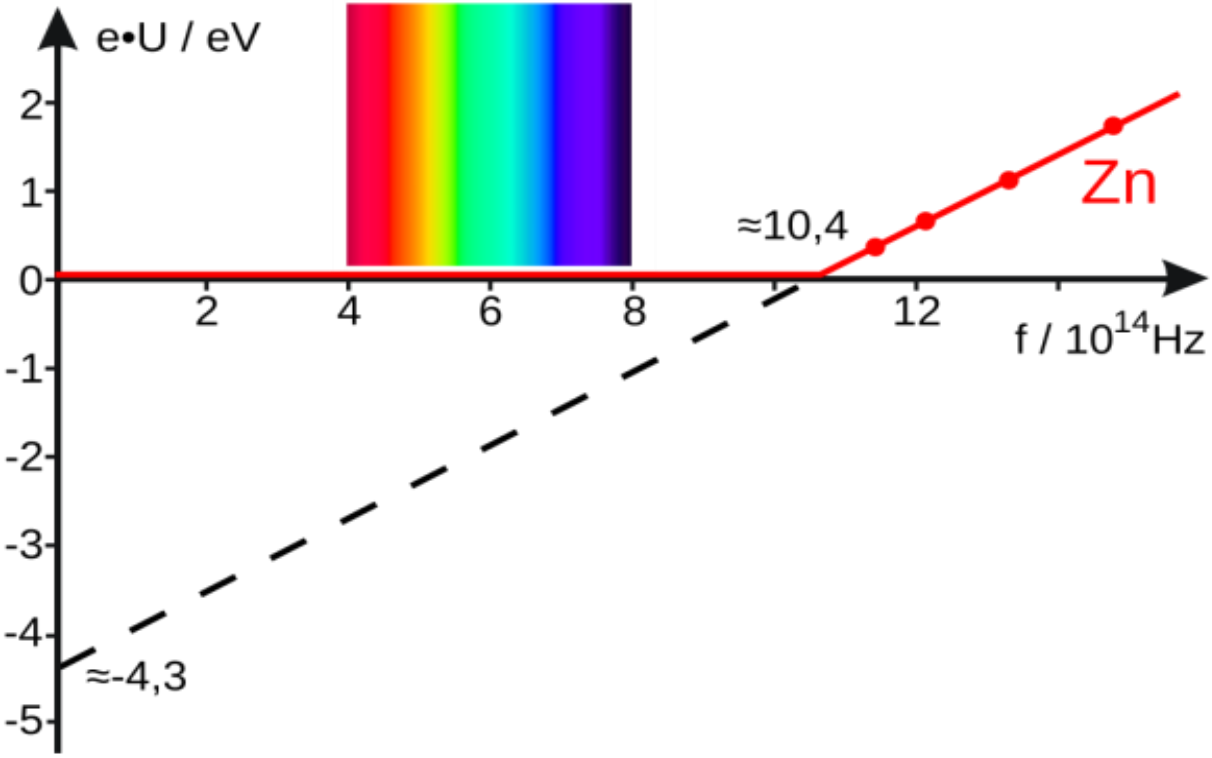
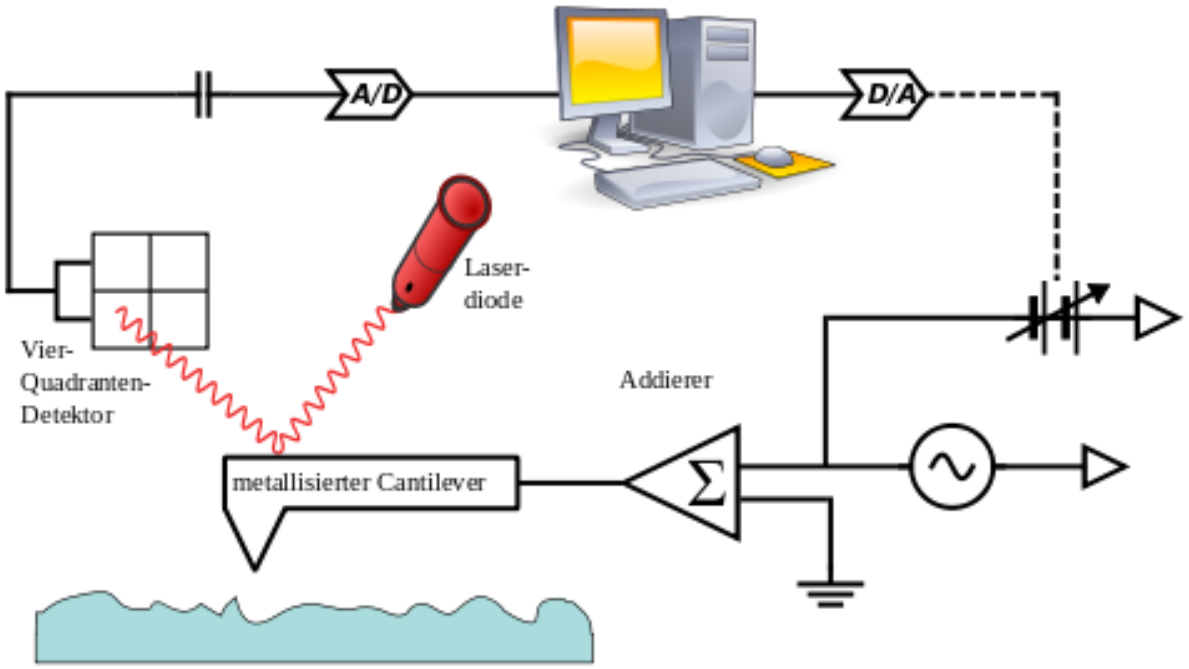
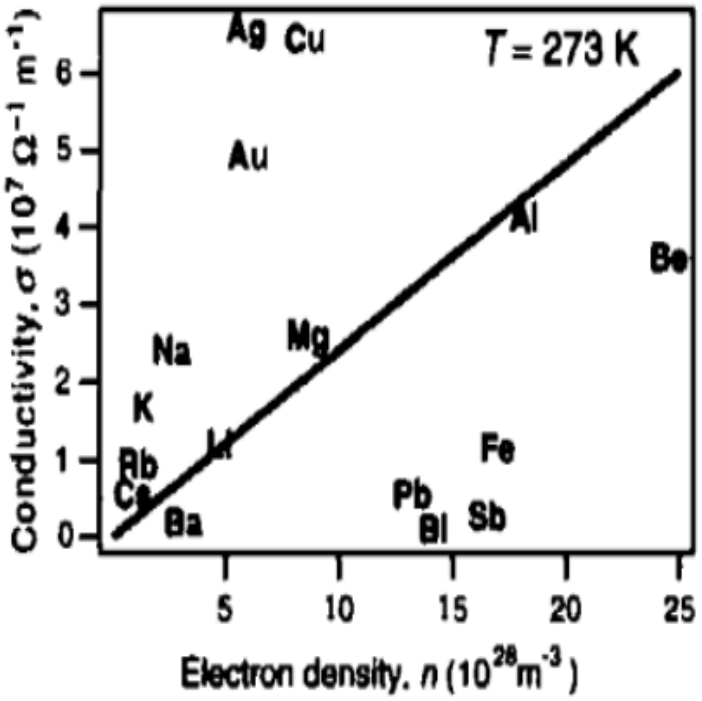
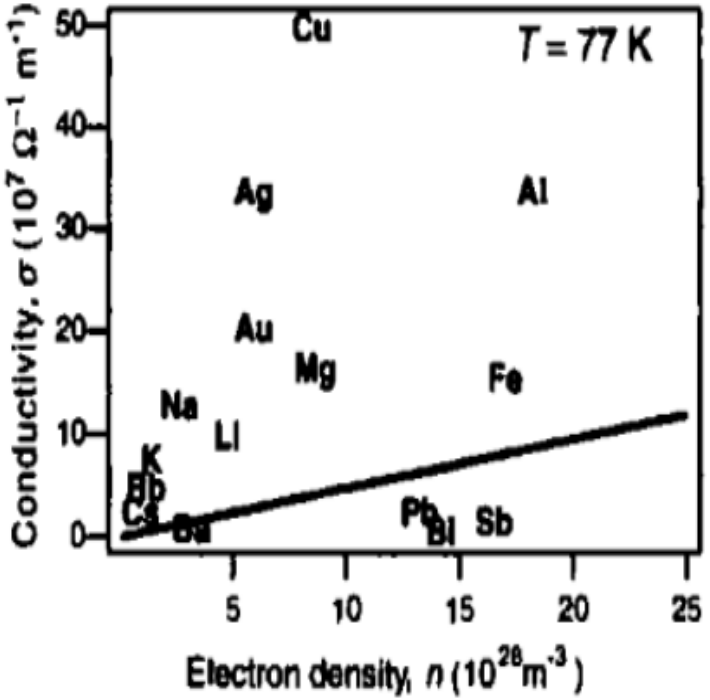
57 La Lanthan 138.9055
58 Ce Cer 140.116
59 Pr Praseodym 140.90765
60 Nd Neodym 144.24
61 Pm Promethium (145)
62 Sm Samarium 150.36
63 Eu Europium 151.964
64 Gd Gadolinium 157.25
65 Tb Terbium 158.92534
66 Dy Dysprosium 162.500
67 Ho Holmium 164.93032
68 Er Erbium 167.259
69 Tm Thulium 168.93421
70 Yb Ytterbium 173.04
71 Lu Lutetium 174.967
89 Ac Actinium (227)
90 Th Thorium 232.0381
91 Pa Protactinium 231.03588
92 U Uran 238.02891
93 Np Neptunium (237)
94 Pu Plutonium (244)
95 Am Americium (243)
96 Cm Curium (247)
97 Bk Berkelium (247)
98 Cf Californium (251)
99 Es Einsteinium (252)
100 Fm Fermium (257)
101 Md Mendelevium (258)
102 No Nobelium (259)
103 Lr Lawrencium (262)
Note: The subgroup numbers 1-18 were adopted in 1984 by the International Union of Pure and Applied Chemistry. The names of elements 112-118 are the Latin equivalents of those numbers.


Incoming blue light
collector plate
emitter plate
vacuum
electrons get to collector plate
Ammeter
Battery
current flows

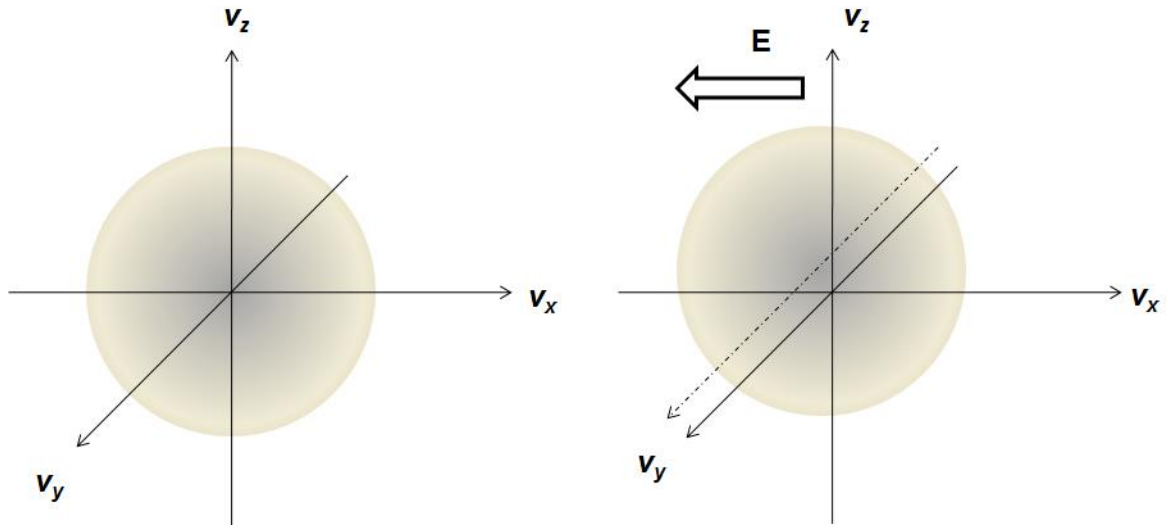

e•U / eV
2
1
0
-1
-2
-3
-4
-5
2
4
6
8
12
f / 10^14Hz
≈10,4
Zn
≈-4,3


A/D
D/A
Laser-
diode
Vier-
Quadranten-
Detektor
Addierer
metallisierter Cantilever
Σ


T = 273 K
Ag
Cu
Au
Al
Be
Mg
Na
K
Li
Rb
Cs
Ba
Fe
Pb
Bi
Sb
Conductivity, σ (10^7 Ω^-1 m^-1)
Electron density, n (10^28 m^-3)
0
1
2
3
4
5
6
5
10
15
20
25


T = 77 K
Cu
Ag
Al
Au
Mg
Fe
Na
Li
K
Pb
Bi
Sb
Conductivity, σ (10^7 Ω^-1 m^-1)
Electron density, n (10^28 m^-3)
0
10
20
30
40
50
5
10
15
20
25

QUANTITY: REFERENCE:	r AIP	r MH		R_H AIP	R_H Hurd	R_H MH	R_H Kittel 1	R_H Kittel 4
Al	2.74	2.65		-0.3	-0.34			-0.39
As	29	33						45
Au	2.2	2.35		-0.72	-0.71		-0.72	-0.7
Be	3.25	4		2.44	2.4		2.44	2.4
Bi	116	107					-100	-5000
Ca	3.35				-1.78	-2.28		
Cd	7.27	7.6		0.6		,55	0.6	
Ce	81	75		0.181	1.92	1.8		
Co	5.8	6.2		-1.33				
Cr	12.9	13			3.7			
Cs	19.96	20		-7.8	-8		-7.8	
Cu	1.7	1.67		-0.55	-0.5		-0.55	-0.5
Dy	90	57		-1.3		-2.7		
Er	81	107		-0.34	-0.34	-0.34		
Fe	9.8	9.71		0.245				
Gd	134.1			-0.95				
Hf	30.6	35.1			0.43			
Hg	95.9				-0.8			
In	8.75	8.37		-0.07	-0.02			


v_z
v_x
v_y
E
v_z
v_x
v_y

Lorenz-Zahl (10^{-8} Watt ohm/K^2)		
Metall	**273K**	**373K**
Ag	2.31	2.37
Au	2.35	2.40
Cd	2.42	2.43
Cu	2.23	2.33
Ir	2.49	2.49
Mo	2.61	2.79
Pb	2.47	2.56
Pt	2.51	2.60
Sn	2.52	2.49
W	3.04	3.20
Zn	2.31	2.33