UM-SJTU Physics Laboratory
Data Sheet (Exercise 4)

Name: 曹致远 Student ID: 518370910030

Name: [illegible] Student ID: 518370910190

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NOTICE. Please remember to show the data sheet to your instructor before leaving the laboratory. The data sheet will not be accepted if the data are recorded with pencil or modified by correction fluid/tape. If a mistake is made in recording a datum item, cancel the wrong value by drawing a fine line through it, record the correct value legibly, and ask your instructor to confirm the correction. Please remember to take a record of the precision of the instruments used.
You are required to hand in the original data with your lab report, so please keep the data sheet properly.

Uncertainty of θ is [2]°.

Maximum Electric Current I_0 1.211[μA] ± 0.001 [μA]			
θ	I [μA] ± 0.001 [μA]	θ	I [μA] ± 0.001 [μA]
0°	1.211	50°	0.506
5°	1.203	55°	0.423
10°	1.178	60°	0.320
15°	1.122	65°	0.223
20°	1.123	70°	0.154
25°	1.056	75°	0.089
30°	0.951	80°	0.041
35°	0.855	85°	0.013
40°	0.736	90°	0.000
45°	~~0.620~~ 0.620		

Table 1. Measurement data Malus' law demonstration.

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Rotation angle of the 1/2-wave plate	Rotation angle of the analyzer [°] ±[2]°
initial	342
10°	327
20°	296
30°	276
40°	259
50°	237
60°	217
70°	198
80°	178
90°	158

Table 2. Measurement data for the 1/2-wave plate.

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Rotation angle of 1/4–wave plate: 0°			
Maximum Electric Current I_0		1.452 ± 0.001 [μA]	
θ	I [μA] ± 0.001 [μA]	θ	I [μA] ± 0.001 [μA]
0°	~~0.047~~ 0.000	180°	0.002
10°	~~0.165~~ 0.047	190°	~~0.~~ 0.051
20°	0.165	200°	0.173
30°	0.364	210°	0.387
40°	0.623	220°	0.566
50°	0.808	230°	0.782
60°	1.126	240°	1.105
70°	1.303	250°	1.307
80°	1.419	260°	1.415
90°	1.452	270°	1.451
100°	1.383	280°	1.372
110°	1.234	290°	1.221
120°	0.946	300°	0.951
130°	0.790	310°	0.796
140°	0.512	320°	0.507
150°	0.313	330°	0.310
160°	0.138	340°	0.135
170°	0.032	350°	0.040

Table 3. Measurement data for the 1/4–wave plate (rotation angle 0°).

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Rotation angle of the 1/4 wave plate: 20°			
Maximum Electric Current I_0		1.201 ± 0.001 [μA]	
θ	I [μA] ± 0.001 [μA]	θ	I [μA] ± 0.001 [μA]
0°	0.156	180°	0.165
10°	0.203	190°	0.234
20°	0.342	200°	0.359
30°	0.441	210°	0.483
40°	0.600	220°	0.641
50°	0.757	230°	0.792
60°	0.899	240°	0.923
70°	1.013	250°	1.051
80°	1.097	260°	1.140
90°	1.176	270°	1.201
100°	1.098	280°	1.152
110°	0.923	290°	0.971
120°	0.765	300°	0.821
130°	0.591	310°	0.620
140°	0.422	320°	0.462
150°	0.278	330°	0.289
160°	0.193	340°	0.231
170°	0.148	350°	0.162

Table 4. Measurement data for the 1/4–wave plate (rotation angle 20°).

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Rotation angle of the 1/4–wave plate: 45°			
Maximum Electric Current I_0		0.705 ± 0.001 [μA]	
θ	I [μA] ± 0.001 [μA]	θ	I [μA] ± 0.001 [μA]
0°	0.612	180°	0.628
10°	0.629	190°	0.623
20°	0.623	200°	0.625
30°	0.634	210°	0.637
40°	0.650	220°	0.652
50°	0.673	230°	0.675
60°	0.692	240°	0.690
70°	0.681	250°	0.705
80°	0.692	260°	0.699
90°	0.686	270°	0.698
100°	0.685	280°	0.683
110°	0.680	290°	0.672
120°	0.675	300°	0.668
130°	0.661	310°	0.659
140°	0.649	320°	0.646
150°	0.628	330°	0.628
160°	0.620	340°	0.617
170°	0.615	350°	0.620

Table 5. Measurement data for the 1/4–wave plate (rotation angle 45°).

Rotation angle of the 1/4–wave plate: 70°	
θ [°] ± [2]°	268
I [μA] ± 0.001 [μA]	1.221

Table 6. Measurement data for the 1/4–wave plate (rotation angle 70°).

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