UM-SJTU Physics Laboratory
Data Sheet (Exercise 4)

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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.

1.418

Uncertainty of θ is [2]°.

Maximum Electric Current I_0	1.037 ± 0.001 μA		
θ	I μA ± 0.001 μA	θ	I μA ± 0.001 μA
0°	1.037	50°	0.470
5°	1.033	55°	0.373
10°	1.017	60°	0.294
15°	0.986	65°	0.206
20°	0.947	70°	0.147
25°	0.896	75°	0.085
30°	0.832	80°	0.043
35°	0.730	85°	0.015
40°	0.643	90°	0.003
45°	0.560		

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	210
10°	232
20°	250
30°	271
40°	292
50°	312
60°	331
70°	352
80°	12
90°	34

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		0.805 ± 0.001 μA	
θ	I [μA] ± 0.001 [μA]	θ	I [μA] ± 0.001 [μA]
0°	0.003	180°	0.003
10°	0.023	190°	0.025
20°	0.090	200°	0.091
30°	0.195	210°	0.195
40°	0.310	220°	0.317
50°	0.421	230°	0.460
60°	0.542	240°	0.596
70°	0.649	250°	0.705
80°	0.713	260°	0.779
90°	0.729	270°	0.805
100°	0.716	280°	0.779
110°	0.668	290°	0.706
120°	0.570	300°	0.599
130°	0.446	310°	0.470
140°	0.316	320°	0.342
150°	~~0.9~~ 0.196	330°	0.210
160°	0.093	340°	0.101
170°	0.029	350°	0.031

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	0.707 ± 0.001 μA		
θ	I [μA] ± 0.001 [μA]	θ	I [μA] ± 0.001 [μA]
0°	0.184	180°	0.179
10°	0.127	190°	0.123
20°	0.109	200°	0.102
30°	0.115	210°	0.116
40°	0.159	220°	0.164
50°	0.236	230°	0.240
60°	0.318	240°	0.345
70°	~~0.418~~ 0.420	250°	0.450
80°	~~0.513~~	260°	0.550
90°	0.589	270°	0.641
100°	0.646	280°	0.693
110°	0.671	290°	0.707
120°	0.662	300°	0.690
130°	0.612	310°	0.644
140°	0.534	320°	0.567
150°	0.453	330°	0.470
160°	0.356	340°	0.363
170°	0.261	350°	~~0.256~~ 0.263

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	0.395 ± 0.001 [uA]		
θ	I [uA] ± 0.001 [uA]	θ	I [uA] ± 0.001 [uA]
0°	0.375	180°	0.371
10°	0.386	190°	0.375
20°	0.392	200°	0.381
30°	0.389	210°	0.385
40°	0.378	220°	0.390
50°	0.366	230°	0.393
60°	0.365	240°	0.395
70°	~~0.362~~ 0.369	250°	0.393
80°	~~0.359~~ 0.364	260°	0.395
90°	~~0.360~~ 0.359	270°	0.392
100°	~~0.356~~ 0.360	280°	0.387
110°	~~0.354~~ 0.356	290°	0.378
120°	0.354	300°	0.370
130°	0.351	310°	0.368
140°	0.348	320°	0.365
150°	0.354	330°	0.363
160°	0.361	340°	0.365
170°	0.360	350°	0.369

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

Rotation angle of the 1/4–wave plate: 70°	
θ [°] ± [2]°	251°
I [uA] ± 0.001 [uA]	0.682

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

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