

# Physical Information Theory, an Oscillator Approach to Elementary Objects

H.J. Dudek, D-53773 Hennef-Rott, Auf dem Komp 19,  
e-mail: hjd-djh@t-online.de

## Contents

### Preface

1. Oscillators of Scalar Complex Fields	1
1.1. Introduction	1
1.2. Correlation Structure of Scalar Complex Fields	2
1.3. Interaction between Scalar Objects and the Photon Cloud	9
1.4. Interaction between Scalar Objects	16
1.5. Summary and Discussion	25
2. Construction of Maxwell Oscillators	27
2.1. Introduction	27
2.2. Construction of the Correlation Structure of Maxwell Fields from the Trace of the Energy Momentum Tensor	27
2.3. Formation of Action and Structures on Fourier Space	39
2.4. Formation of the Correlation Structure of Maxwell Photons under Conditions of the PSCO	52
2.5. Summary and Discussion	64
3. Properties of Maxwell Oscillators	67
3.1. Introduction	67
3.2. Oscillation Mechanism of Maxwell Photons	67
3.3. Interaction between Photons of Static Maxwell Fields	81
3.4. Correlations with Elements outside the Trace of the Energy Momentum Tensor	95
3.5. Properties of Unity Cubes	103
3.6. Elements Forming the Physical Information	110
3.7. Summary	121
3.8. Discussion	122
4. Characterization of Maxwell Photons	125
4.1. Introduction	125
4.2. Correlation Structure of Maxwell Vacuum	125
4.3. Correlation Structure of Photons of Static Maxwell Fields	137
4.4. Correlation Structure of Photons of Dynamic Maxwell Fields (Photons of Light)	147
4.5. Summary and discussion	165
5. "Scalar" and Static Photons	167
5.1. Introduction	167
5.2. Scalar Oscillators O1 and O2	167
5.3. Oscillation in Particle- and in Wave- Properties under Application of Static Photons	176
5.4. Analysis of Particle State of Scalar Oscillators	186
5.5. Summary and Discussion	194
6. Wave Properties Formation	197
6.1. Introduction	197
6.2. Interaction of Charges with a Potential Gradient	197
6.3. Wave Formation of Particles in a Homogeneous Potential Gradient	203
6.4. Oscillation Mechanism of Scalar Neutral Particles	219
6.5. Oscillation of Scalar Oscillators without a Photon Cloud	228

6.6. Discussion .....	234
7. Magnetic Photons	237
7.1. Introduction .....	237
7.2. Formation of Magnetic Photons .....	237
7.3. Formation of Magnetic Field Lines .....	243
7.4. Analysis of Magnetic Photons .....	255
7.5. Interlinking of Scalar Oscillators with Magnetic Maxwell Photons .....	261
7.6. Formation of Electromagnetic Waves .....	267
7.7. Oscillation of $E_3$ and $B_3$ fields in an Electromagnetic Wave .....	271
7.8. Oscillation of Action in Electromagnetic Waves .....	273
7.9. Formation of Dynamic Photons during Oscillation of Static Photons .....	279
7.10. Summary .....	284
8. Physical Reality Experiments	287
8.1. Wave- Particle Dualism of Dynamic Maxwell Photons .....	288
8.2. Wave- Particle Dualism of Material- Waves .....	290
8.3. Further Quantum Mechanical Effects .....	296
8.4. Double Slit Experiment .....	298
8.5. "Which Way" Experiment .....	300
8.6. Aharonov Bohm Effect .....	303
8.7. Non Locality Experiments .....	305
8.8. A Short Excursion to Particle Physics .....	309
8.9. Discussion of Quantum Mechanical Effects .....	321
9. Relation to Classic Physics and Quantum Mechanics	325
9.1. Introduction .....	325
9.2. Oscillators on Fourier Space .....	325
9.3. Relation to Classic Physics .....	332
9.4. Relativistic Mass Dependence and Oscillator Properties .....	345
9.5. Interaction between Masses .....	351
9.6. Relation to Quantum Mechanics .....	377
9.7. Significance of Wave Trains .....	404
9.8. Philosophical Implications .....	412
9.9. Discussion .....	420
10. Physical Information	423
10.1. Introduction .....	423
10.2. Characterization of Physical Information in Particle, Wave and Magnetic Properties .....	423
10.3. Formation of Action on Fourier Space .....	432
10.4. Process of Virtual Storage of Physical Information .....	447
10.5. Oscillation and Information- Memory Formation .....	463
10.6. Interaction under Exchange of Physical Information .....	476
10.7. Relation of PIT to Quantum gravity	485
10.8. Discussion .....	498
10.9. Summary .....	508
A. Appendix: Formation of Correlations	511
A.1. Wiener- Khintchine Theorem .....	511
A.2. Inversion of the Theorem .....	512
A.3. Inversion of the Factors in the Product .....	512
A.4. Connection of Correlations .....	513

B. Appendix: Scalar Oscillator Properties	515
B.1. $\mu = i$ Oscillator of Neutral Particle	515
B.2. $\mu = i$ Oscillator of Particle	516
B.3. $\mu = i$ Oscillator of Anti- Particle	516
B.4. Interaction of Scalar Objects: $\mu = 0$ Oscillators	517
B.5. Change of the $\mu = i$ Oscillator in State Z1 of a Particle	518
B.6. Canonical Momenta of Scalar Oscillators	520
C. Appendix: Introduction of Static Photons into Scalar Oscillators	523
C.1. Relations between the $\mu$ - Correlations of Scalar and Static Photons	523
C.2. Properties of Static Maxwell Oscillators	524
C.3. Currents in $\mu = 0$ Scalar Oscillators	525
C.4. Common Oscillation of Scalar Oscillators and of Static Maxwell Photons	526
D. Appendix: Correlation Structure of Static Maxwell Photons of the Vacuum	533
D.1. General Structure of Static Maxwell Photons	533
D.2. Static O-X- Photon V(+)	534
D.3. Static O-X- Photon V(-)	535
D.4. Wave Properties of Static Vacuum Photons	536
D.5. Static Maxwell Photons of the Vacuum with Inverted Coordinate System	538
D.6. Partly Active Correlation Structures of Vacuum	539
D.7. Asymmetry of $\mu = 0$ Oscillators	539
D.8. Formation of Transversal Vacuum Networks	541
E. Appendix: Correlation Structure of Dynamic Maxwell Photons of Vacuum	543
E.1. Possible Correlation Structures of Dynamic Maxwell Photons	543
E.2. Dynamic O- Photon of Vacuum	544
E.3. Dynamic Maxwell Photons of Vacuum with Inverted Coordinate System	550
E.4. Partly Activated Vacuum Photons	552
F. Appendix: Correlation Structure of Static Maxwell Photons	553
F.1. Particle Properties	553
F.2. Static O-X- Photon (+)0123 with Particle Properties	554
F.3. Static O-X- Photon (-)0123 with Particle Properties	555
F.4. Photons of Neutral Particles, Particle Properties	556
F.5. Wave Properties of Static Photons	558
F.6. Magnetic Properties of Static Maxwell Photons	559
F.7. Different Parts (1/2) and (0/3) of Different Signs	561
F.8. Symmetries in Magnetic Photons	562
F.9. Photons with Vanishing E- and B-Fields	564
F.10. Properties of the $\mu = 0$ Oscillators	565
F.11. Signs and Circulation Directions of Currents in Static Maxwell Photons	567
F.12. Interaction of Static Photons with Scalar Oscillators	568
F.13. Alpha Paths of Static Maxwell Photons	563
F.14. Formation of Deltas of Virtual Action	575
G. Appendix: Correlation Structure of Dynamic Maxwell Photons	581
G.1. Linear Polarized Dynamic Photons	581
G.2. Elliptic Polarized Dynamic Photons	582
G.3. Not Interfering Dynamic Photons	585
G.4. Transversal Activated Photons	586
G.5. Four Dimensional Activated Photons	587
G.6. Elliptic Polarized Dynamic Photons with Inverse Coordinate System	587

G.7. Formation of Entangled Dynamic Photons with Action Equal Zero . . . . .	588
H. Appendix: Maxwell Photons, Described by Tensor Elements Outside the Trace	591
H.1. Determination of Tensor Components outside the Trace . . . . .	591
H.2. Correlations of Tensor Components outside the Trace . . . . .	591
H.3. Summary of Tensor Components outside the Trace . . . . .	596
H.4. Variation of Tensor Components outside the Trace . . . . .	598
H.5. Interaction of the $\mu = 0$ Oscillators . . . . .	601
H.6. Analysis of a Path of a Static Photon . . . . .	603
H.7. Analysis of a Path of a Dynamic Photon . . . . .	605
H.8. Discussion . . . . .	607
I. Appendix: Tables of Currents	609
I.1. Currents in the $E_i$ and $B_i$ -Cubes of Correlation Structures of Static Maxwell Photons with Wave Properties . . . . .	609
I.2. Currents in the $E_i$ and $B_i$ - Cubes of Correlation Structures of Magnetic Maxwell Photons . . .	611
I.3. Currents in the $E_i$ and $B_i$ - Cubes of Neutral Particle . . . . .	612
I.4. Currents in Unity Cubes of Maxwell Photons . . . . .	614
J. Appendix: Interaction between Static and Dynamic Maxwell Photons	617
J.1. Oscillation Behavior of Particle and Anti-Particle in Interaction . . . . .	617
J.2. Interaction of Magnetic Photons with Dynamic Vacuum Photons . . . . .	618
J.3. Formation of Axion like Photons . . . . .	623
J.4. Dark Photons . . . . .	626
J.5. Fluctuation of Dark O-X-Photons . . . . .	626
J.6. Interaction between Static and Dynamic Photons . . . . .	628
J.7. Structure and Properties of Gravitons . . . . .	636
Summary	645
Bibliography	651