Hans Widmer

# Essentials of Deductive Physics

## Foundation for the great theories of physics

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**The great theories of physics are field theories: infinitesimal contact between causes and effects across all space; this was already the function of Descartes' ether. Hidden in all field theories there is a continuum, it is the assumption whose mathematics are field equations. While conventional physics proceeds inductively and concludes a continuum from phenomena, deductive physics pursues the reverse path and derives from a continuum all material phenomena as dynamics of it. Continuum is the substrate organising itself into matter. Matter is organisation of continuum, not continuum. Elementary material organisations are the substrate for higher organisations. Inertia, gravitation, electromagnetism develop dynamically, they are not already contained in the elementary; they compellingly derive from the dynamics of the continuum.**

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Foundation for the Great Theories of Physics

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First edition 2014

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Photograph of Hans Widmer, p. 138: Felix Ghezzi

Printed: Books on Demand GmbH, Norderstedt
Paper: Cream white, 90 g/m²

ISBN: 978-3-907625-70-5

# Content

# Preface to the English Edition

Deductive Physics does arguably lead to the established laws of physics; however, it is totally heterodox, pole-axes the traditional physicist and might easily be dismissed as yet another "fantastic idea". That is why a short introduction titled "What is Gained with 'Deductive Physics'?" precedes the translation from German. In addition, the reader's attention may be drawn to the fact that deductive physics is the continuation of the works of Lorentz[1853–1928] and Poincaré[1854–1912], which Einstein explicitly has paid tribute to[1955].

On the occasion of a lecture at the Faculty of the Department of Physics at ETH Zurich abbreviated derivations of 15 laws for which conventional inductive physics cannot provide reason—save that they stand the test of time—were presented.

## What is Gained with "Deductive Physics"?

Towards the end of the seminar at ETH Zurich on 15 May 2014 Gianni Blatter, professor of theoretical physics, asked the crucial questions: What is gained with this physics, which open items does it resolve or what does it predict?

Well, in general physics would be simplified by one order of magnitude:

– the closed theories of *inductive physics* comprise 75 independent laws and constants, to these come the uncounted ones of super symmetry and string theory,
– while deductive physics derives all laws from its single axiom, the specific continuum (with $c, G, \hbar$); with it all explanations are monolithic and there is no need for further grand unification.

## *I – On the Matter of Physics*

### *Relativity Theory (RT)*

1. Inertia does not require any Higgs boson for the field needed to represent it: the influx towards mass *is* this field. The phenomenon "mass" results from interactions with fields outside the hadron. It determines all frequencies within the hadron, though there is no mass per se inside the hadron.
2. Gravitation does not require any graviton (the latter merely being postulated in analogy to the virtual photon), but results from mutual attraction of sources and sinks, which the phenomenon "mass" is both at the same time (the constituents of the continuum could be called gravitons).
3. Dark matter is not needed and the miracle of what it is vanishes. The attraction towards the centres of galaxies is explained by their black hole—however, not by attractive force, but by floating along the influx towards the black hole.
4. Dark energy is not needed and the miracle of what it is vanishes. The constantly growing black holes, which repel one another as sinks, explain the accelerated expansion of the universe. Friedmann models are impossible (a primordial concentration with infinite mass density and vanishing size are ruled out by the constituents of the continuum occupying space; singularities altogether are impossible); the cosmological constant is useless.
5. The universe has more degrees of freedom than represented in the standard model: $G$ and $\hbar$ change as the density of the conti-

nuum decreases. Only $c$ remains constant (as the relation of space and time in subjective perception).

***Quantum Mechanics (QM)***

1. The probability laws of QM are consequences of continuum dynamics. They are not the fundamental laws of nature, forcing departure from causality.
2. The new conservation quantity QM introduces is not only hidden in the Schrödinger equation and is not a mere quantum number, but is the field energy annihilated by the interference wave.
3. The wave QM introduces is not primarily the probability amplitude for the locus of a particle (which often leads to false conclusions: for instance that the $e^-$ would mainly be occupying the centre of the $H_1^1$), but is the interference wave of the radiations, exuding from masses.
4. The action quantum is not a quantum of anything, but a property of the continuum (correlated with its free path length), and manifests itself in resonances. Wherever $\hbar$ appears, there are resonances.
5. Tuned states are based on synchronisation of mechanical frequencies and frequencies of interference waves from Lorentz contractions (for instance of the $e^-$ inside $H_1^1$).
6. The electron inside the hydrogen atom oscillates, but does not radiate, because the corresponding radiation is absorbed within the interference wave.
7. The zero point energy does not come from nowhere, but is the annihilated radiation having turned into oscillation (residence at the origin requiring energy for which there is no source).
8. The Schrödinger equation arises from the frequency of superimposed Lorentz contractions from relative velocity and potential field at once.
9. Quantum entanglement (Einstein: "spooky action at a distance") rests on states tuning first, which the local and realistic field of the continuum can describe, whereas the tuned interference

wave *simultaneously* appears and can be measured in the entire space.

***Standard Model of Elementary Particle Physics (SM)***

1. All "quarks" are variations of one and the same vortex with different angular momenta, in different distances and different topologies.
2. Primary conservation quantity is the angular momentum (resonance in vortices → quark). When several vortices aggregate, there are two relative positions relative to each other: $d$ and $u$. Topologically only $c$ and $t$ can take the place of $u$, that of $d$ only $s$ and $b$.
3. In the baryon three individually unviable vortices aggregate orthogonally (which neutralises attraction or repulsion from rotation). The three colours of the standard model are the three spatial axes, also appearing in the Dirac matrix. Leptons are composed tri-orthogonally as well.
4. Secondary conservation quantity is the topology of the baryon: the beta decay for instance is based on the position exchange of a vortex. All conservation quantities like parity refer to combinations of conservation of angular momentum and topology of the affected vortices. The gauge theories central in the SM define topological invariants.
5. The electroweak force is not a force, but reflects the small probability for topological conversion, which in turn rests on the large conversion energy required (6 new vortices provided by the $W^-$ boson).
6. The strong interaction is based on phase shift by $\pi$ of the radiation emitted from the vortices. *Confinement* represents an energy minimum by the interference wave. Higher energy particles consist of vortices in minima $n > 1$.
7. The asymmetry in the abundance of particles and anti-particles is caused by vortices being formed first in the Big Bang (total an-

gular momentum equals zero), then aggregating into particles, not anti-particles.

***Electromagnetism***

1. The electric field is generated by elementary particle dynamics ("charge" is a dynamics—nothing material). The identifying quantity is the fine structure constant.
2. Radiation has the rest frequency of the electron and is being emitted from a sphere having a radius of the Compton length.
3. Virtual photons are rotating waves with the Compton length as their radius (from resonance).
4. Electric forces are based on annihilation or repulsion of rotational radiation.
5. The Maxwell equations are the continuity equation for the vortex density $B$ (magnetic field), the Euler equation for the vortex flux $E$ (electric field).
6. The gauge theories employed in the SM are generalizations of the Maxwell equations, which essentially process rotation mathematically. Thus gauge theory turns out as the vehicle with which the SM introduces rotation.
7. Spin $\hbar/2$ of the Dirac particle results from the precession that the rotation of its three vortices causes mutually.

***II – Epistemologically***

1. Reduction of the number of independent constants and laws by about one order of magnitude.
2. Saving the effort of *physics by extrapolation*.
3. Being conscious that physics resides in the human brain:
   - space and time remain the coordinate system within which reason maps its experiences,
   - the continuum is the substrate in the human coordinate system with which physical phenomena can be emulated,

– laws are to be invented freely (Einstein)—not to be found in nature like hidden Easter eggs,
– the reconstruction of causality remains the objective: deductive physics studies "realistic and local" causes—while QM studies the statistics of outcomes,
– uncertainty reflects the lack of knowledge.

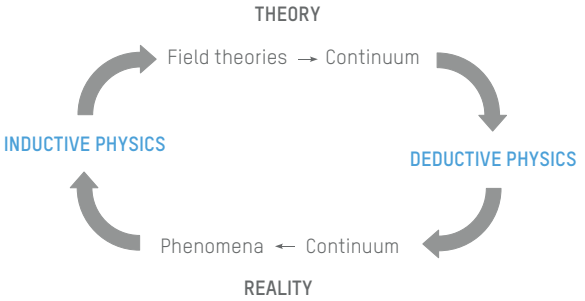
### *III – Didactically*

1. Immovable foundation – physics in its most delicate ramifications and sublime mathematical complexities never contains more than what is embedded in its foundation; never has a great contribution to physics originated from intricate thinking.
2. *Grasping* the fundamentals of all physics in, say, twelve lectures and twelve tutorials by students with basic knowledge of calculus.

# Principle of Deductive Physics

The laws of physics resulted from analysis of individual aspects of the material world; experiment and observation have always been the basis, which is why no common foundation arose for relativity, quantum mechanics, elementary particle physics and electromagnetism. As new phenomena arose which current understanding did not explain, one would turn to new concepts and increase the number of independent laws and constants: the completed theories comprise 75 of these, the still open ones over a hundred.[1] This dissatisfying state generates a permanent endeavour for unification ("Grand Unification", "Theory of Everything" etc.).

The great theories of physics are field theories, and this means: infinitesimal contact between causes and effects across all space; this was already the function of Descartes' ether. Hidden in all field theories there is a continuum, it is the assumption whose mathematics are field equations. While conventional physics proceeds inductively and concludes a continuum from phenomena, deductive physics (epistemological foundations[2]) pursues the reverse path, deriving from a continuum all material phenomena as dynamics of it:




Continuum is the substrate organising itself into matter. Matter is *organisation* of continuum, not continuum. Elementary material organisations are the substrate for higher organisations. Inertia, gravitation, electromagnetism develop dynamically, they are not already contained in the elementary (emergence). The infinitesimal dynamics of the continuum is the foundation of deductive physics.

The constituents of this continuum are pure bodies, defined as permanent, impermeable volumes—counterparts to empty space and not distinguished by anything else (especially *not* by inertia: this results only from the *dynamics* of the continuum). Deductive physics requires only this for representing the material world: the coordinate system spanned by space and time as well as bodies therein as constituents of a specific continuum. This continuum is not just an idea as in Descartes nor does it hide in mathematics as in Einstein, but it:

- *is* the analogue to an isothermal gas, as already implied by the equations of the theory of relativity (TR);
- *is* specified by fundamental constants:
  - $c$ for perturbation propagation speed, $c = \sqrt{\partial p / \partial \rho}$ ("speed of sound" within continuum),
  - $G$ for inverse density (indirectly),
  - $\hbar$ for free path length (indirectly);

- *explains* what inductive physics simply accepts, specifically why
  - interactions are not instantaneous,
  - gravitation and electromagnetism have the same speed of propagation,
  - interference at atomic scale produces quantum mechanical phenomena (frequency shift),
  - interference at Compton length produces the strong force (phase shift);
- *links* TR and quantum mechanics (QM), as the de Broglie-Einstein Relations of QM derive from TR's Lorentz contraction;
- *reconciles* QM with Einstein's postulate of a "local and realistic" theory (specifically in the interpretation of quantum entanglement[3]);
- *supports* both:
  - the dynamics of the elementary building blocks of matter,
  - the expansion of the universe.

It is not nature imposing itself with concepts and laws, instead these have to be invented as hypotheses and validated in experiment.[4] The touchstone for perception in deductive physics are the laws of inductive physics. Thus it is standing on the shoulders of giants from Kepler to the inventors of the Standard Model.