

Lecture on Einstein's UNIFIED FIELD THEORY

Don't make Aristotle's mistake; embrace the mathematics!

1. Einstein's objections to quantum theory.

Intrinsically probabilistic & describes the way the world *appears* not the way it *is*.

Extreme Copenhagenism (Aage Bohr): Positivism vs. Aristotle's Mistake.

2. Unified field theory

On the History of Unified Field Theories, Hubert F. M. Goenner

<http://emis.kaist.ac.kr/journals/LRG/Articles/lrr-2004-2/download/lrr-2004-2BW.pdf>

Kaluza-Klein; Weyl's work on Connections; Yang-Mills equations.

“In addition to the wave equations a complete scheme must include electromagnetic and gravitational equations. These will differ from the equations of Maxwell and Einstein in having ‘wave’ terms instead of ‘particle’ terms for the current vector and material energy tensor.

A.I.Komech, **Lectures on Quantum Mechanics (nonlinear PDE point of view),**

http://arxiv.org/PS_cache/math-ph/pdf/0505/0505059v4.pdf

This book realizes Einstein's Unified Field Theory Program and shows that all the empirical results known until the 1980's were derivable from it. From the quantum mechanical point of view, it is a local hidden variables theory and hence cannot derive EPR type results-Bell's Theorem. EPR type experiments were performed in the 1980's and confirmed quantum theory; leaving viable only Bohmian style non-local hidden variable theories-which cannot be Lorentz invariant. Such applications as quantum cryptography and quantum computing require EPR type situations. The Maxwell-Dirac system is the super-classical limit of (the **not** mathematically well-defined) QED.

3.

PROGRAM FOR SCESM

The Super-Classical Einstein-Standard Model

Note: SCESM forms a non-commutative geometry, thus satisfying the ***geometrization program for unified field theory!*** The electron parameters e and m_e are now analogous to π !

1. Extend *Asymptotic Completeness, Global Existence and the Infrared Problem for the Maxwell-Dirac Equations* (*Memoirs of the American Mathematical Society*), by [M. Flato](#), [Jacques C. H. Simon](#), [Erik Taflin](#), http://www.amazon.com/Asymptotic-Completeness-Existence-Maxwell-Dirac-Mathematical/dp/0821806831/ref=sr_1_1?ie=UTF8&s=books&qid=1240926988&sr=1-1, to SCESM.

2. Show that the positivity condition in the Penrose-Hawking singularity theorem doesn't hold for SCESM-

see: [Stephen W. Hawking](#), [G. F. R. Ellis](#), *The Large Scale Structure of Space-Time*,

http://www.amazon.com/Structure-Space-Time-Cambridge-Monographs-Mathematical/dp/0521099064/ref=pd_bbs_sr_1?ie=UTF8&s=books&qid=1240927769&sr=8-1

- and one could get Black Stars instead of Black Holes, see

<http://www.scientificamerican.com/article.cfm?id=black-stars-not-holes>

Note: Prior to ~1975 there was no **classical** super theory; this was one of the main inhibitors of Einstein's Unified Field Theory Program.

3. i. Derive approximate history of the universe from SCESM - both analytically & via computer simulation.
- ii. Compare with ESM (the QSM in a curved space-time).
- iii. Compare with observation.

See:

1. [Steven Weinberg](#), *Cosmology*,

http://www.amazon.com/Cosmology-Steven-Weinberg/dp/0198526822/ref=sr_1_1?ie=UTF8&s=books&qid=1240928371&sr=1-1

2.A.I.Komech, **Lectures on Quantum Mechanics (nonlinear PDE point of view)**,

http://arxiv.org/PS_cache/math-ph/pdf/0505/0505059v4.pdf

4. Show that the solution space to SCESM, F , is a reasonable infinite dimensional super-symplectic manifold. See:

Supersymmetry for Mathematicians: An Introduction,
[http://www.amazon.com/Supersymmetry-Mathematicians-Introduction-Courant-Lecture/dp/0821835742/ref=sr_1_5?
ie=UTF8&s=books&qid=1240894011&sr=1-5](http://www.amazon.com/Supersymmetry-Mathematicians-Introduction-Courant-Lecture/dp/0821835742/ref=sr_1_5?ie=UTF8&s=books&qid=1240894011&sr=1-5)

5. Apply deformation quantization to F to obtain mathematically rigorous definition of SQESM (quantum version of SCESM). See:

Deformation Theory and Symplectic Geometry, by [Daniel Sternheimer](#) ,
[John Rawnsley](#) ,

[http://www.amazon.com/Deformation-Symplectic-Geometry-Mathematical-Physics/dp/0792345258/ref=sr_1_1?
ie=UTF8&s=books&qid=1240930131&sr=1-1](http://www.amazon.com/Deformation-Symplectic-Geometry-Mathematical-Physics/dp/0792345258/ref=sr_1_1?ie=UTF8&s=books&qid=1240930131&sr=1-1)

6. Derive history of the universe from SQESM and compare with observation.

--

Dr. David A. Edwards
Department of Mathematics
University of Georgia
Athens, Georgia 30602
[http://www.math.uga.edu/~davide/
dedwards@math.uga.edu](http://www.math.uga.edu/~davide/dedwards@math.uga.edu)

