

Mysteries of the World

1. Relation between large scale world and small scale world.
general relativity versus quantum mechanics
(special relativity versus quantum field theory)
curved space-time ~~structure~~ Hilbert space
general covariance spinor
nonlinearity linear operator
2. Symmetry in elementary particle system
space-time sym. intrinsic sym
parity isospin
chirality (helicity) strangeness
particle-antiparticle ~~or antiparticle~~
arising from
3. Peculiarity of electromagnetic interaction
mystery of electromagnetism
q.e.d.
4. Mystery of μ -meson
mass of μ -meson
decay processes involving μ and e
5. Mass spectrum
existence or non-existence of particles
6. Size of particles (nucleon) ~~particles~~
non-locality Mystery of nucleon size
7. Quantization of non-linear field
indefinite metric $\leftrightarrow$ regularization
Feynman (Pauli-Villars)
fictitious particles

7- Mysteries of Contemporary Fundamental Physics

1. Mystery of Muon

3. Mystery of Electromagnetism

2. Mystery of Strange Particles

4. Mystery of Nucleon Size

5. Mystery of Mass Spectrum

6. Mystery of Probabilistic Interpretation
Validity Non-linearity Non-locality
Indefinite Metric

7. gap between general theory of
relativity and quantum mechanics (1),
Special Relativity vs.
Mystery of gravitation

6. Mystery of Quantization