Large scale physics

Large scale fluid dynamics

Physical fields-1

- UHF wave modulations
  - Photon $\quad\quad \nabla\psi = 0$
  - Gluon $\quad\quad \nabla^2\psi = 0$

  harmonic

  $$\nabla\psi = m\varphi$$

  - Energy quanta

  $$\sum_i n_i e_i \psi_i$$
  $$e_i = \pm e$$

- UHF wave potentials
  - Electromagnetic field
  - Gravitation field

  $$\sum_i n_i m_i \varphi_i$$

Physical fields-2

- Fields from step stone distributions
  - Quaternionic quantum state function
  - QPAD
    - Quaternionic distributions
    - Charges are preserved

$$\nabla \psi = m\varphi$$

Inertia-1

- Inertia is implemented via the embedding continuum

- The embedding continuum is formed by the superpostion of the wave fronts that are emitted by all elementary particles

- We call the contributions to the background field bgc-fields

Inertia-2

$$\Phi_0 = \int_V \psi \, dV$$

In a uniform background:
$$\psi = {}^{\rho_0}\!/_r \; ; \; \rho_0 \text{ is constant}$$

- $\Phi_0 = \int_V {}^{\rho_0}\!/_r \, dV = \rho_0 \int_V {}^1\!/_r \, dV = 2\pi R^2 \rho_0$

- $G = -c^2 \Phi$ (Dennis Sciama)

- $\mathbf{\Phi} = \int_V {}^{\rho_0 \boldsymbol{v}}\!/_{c\,r} \, dV = \Phi \, {}^{v}\!/_c \; ; \;\; \dot{\mathbf{\Phi}} = \Phi_0 \, {}^{\dot{v}}\!/_c$

- $\mathfrak{E} = \nabla_{\mathbf{0}} \mathbf{\Phi} + \nabla \Phi_0 = \dot{\mathbf{\Phi}} + \nabla \Phi_0 = \Phi_0 \, {}^{\dot{v}}\!/_c + \nabla \Phi_0$

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Inertia-3

- Φ_0 is a scalar background field
- $\boldsymbol{\Phi}$ is a vector background field
- G is gravitational constant
- $\mathfrak{E} = \Phi_0\,\dot{v}/c + \boldsymbol{\nabla}\Phi_0$
- $\mathfrak{E} \approx \Phi_0\,\dot{v}/c = G\dot{v}$
- Acceleration goes together with an extra field $\mathfrak{E}$
- This field counteracts the acceleration

Inertia-4

- Starting from coupling equation
- $\nabla\psi = m\varphi$
- $\psi = \chi + \chi_0\,\boldsymbol{v}$
- χ represents particle at rest
- $\psi_0 = \chi_0$
- $\boldsymbol{\psi} = \chi + \chi_0\,\boldsymbol{v}$
- $\nabla_0\boldsymbol{\psi} = \chi_0\,\dot{\boldsymbol{v}} = m\boldsymbol{\varphi} - \nabla\psi_0 - \nabla\times\psi$
- $\mathfrak{E} \equiv \nabla_0\boldsymbol{\psi} + \nabla\psi_0$

Small

Represents influence of distant particles

Continuity equation

- Balance equation
- Total change within V
  $$= \text{flow into } V + \text{production inside } V$$

- $\dfrac{d}{d\tau}\int_V \rho_0\, dV = \oint_S \hat{\boldsymbol{n}}\rho_0 \dfrac{\boldsymbol{v}}{c}\, dS + \int_V s_0\, dV$

  Gauss

- $\int_V \nabla_0\rho_0\, dV = \int_V \langle\boldsymbol{\nabla}, \boldsymbol{\rho}\rangle\, dV + \int_V s_0\, dV$

- $\boldsymbol{\rho} = \rho_0\boldsymbol{v}/c$

- $\rho = \rho_0 + \boldsymbol{\rho}$

- $s = \nabla\rho$

- $s_0 = 2\nabla_0\rho_0 - \langle\boldsymbol{v}(q), \boldsymbol{\nabla}\rho_0\rangle - \langle\boldsymbol{\nabla}, \boldsymbol{v}\rangle\,\rho_0$

- $\boldsymbol{s} = \nabla_0\boldsymbol{v} + \boldsymbol{\nabla}\rho_0 + \rho_0\boldsymbol{\nabla}\times\boldsymbol{v} - \boldsymbol{v}\times\boldsymbol{\nabla}\rho_0$

Inversion surfaces

- $\frac{d}{d\tau} \int_V \rho\, dV + \oint_S \widehat{\boldsymbol{n}}\rho\, dS = \int_V s\, dV$

- $\int_V \nabla \rho\, dV = \int_V s\, dV$

- The criterion $\oint_S \widehat{\boldsymbol{n}}\rho\, dS$=0 divides universe in compartments

Inversion surface

Compartments

Huge BH ⇔ s tart of new episode

universe

Black holes

BH⇔densest packaging

Merge

Huge
BH

Compartments

Never ending story

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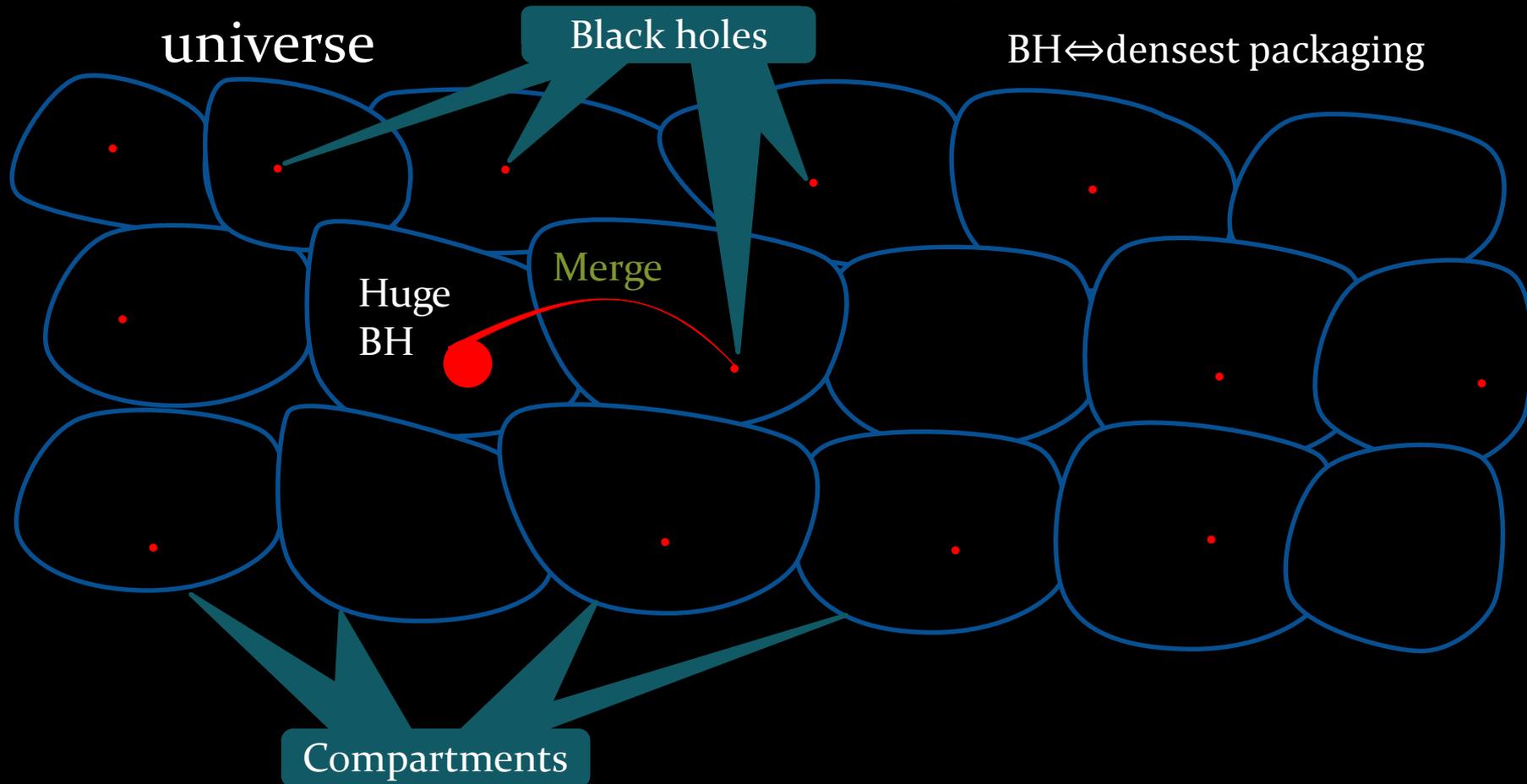
History of Cosmology

- Black hole represents natal state of compartment
- Black holes suck all mass from their compartment
- A passivized huge black hole represents start of new episode of its compartment
- Driving force is enormous mass present outside compartment $\Rightarrow$ expansion
- Whole universe is affine space

- Result is never ending story

Gravitation

- The Palestra is a curved space

- $\mathcal{P}_{blurred} = \wp_{sharp} \circ \mathcal{S}_{spread}$

- $ds(x) = ds^{\nu}(x)e_{\nu} = d\wp = \sum_{\mu=0...3} \frac{\partial \wp}{\partial x_{\mu}} dx_{\mu} = q^{\mu}(x)dx_{\mu}$

  16 partial derivatives

- q^{μ} is quaternion

- $c^2\, dt^2 = ds\, ds^* = dx_0^2 + dx_1^2 + dx_2^2 + dx_3^2$ Pythagoras

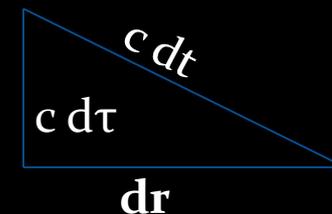- $dx_0^2 = d\tau^2 = c^2\, dt^2 - dx_1^2 - dx_2^2 - dx_3^2$ Minkowski

- $\Delta s_{flat} = \Delta x_0 + \boldsymbol{i}\,\Delta x_1 + \boldsymbol{j}\,\Delta x_2 + \boldsymbol{k}\,\Delta x_3$ Flat space

- $\Delta s_{\wp} = q^0 \Delta x_0 + q^1\,\Delta x_1 + q^2\,\Delta x_2 + q^3\,\Delta x_3$ Curved space

$c\, dt$

$c\, d\tau$

$\mathbf{dr}$

Metric

- $d\wp$ is a quaternionic metric
- It is a linear combination of 16 partial derivatives
- $d\wp = \sum_{\mu=0\ldots3} \dfrac{\partial \wp}{\partial x_\mu} dx_\mu = q^\mu(x) dx_\mu$

$$= \sum_{\mu=0\ldots3} \sum_{\nu=0,\ldots3} e_\nu \frac{\partial \wp_\nu}{\partial x_\mu} dx_\mu = \sum_{\mu=0\ldots3} \sum_{\nu=0,\ldots3} e_\nu q^\mu_\nu dx_\mu$$

- Avoids the need for tensors

Composites

The effect of modularization

Modularization

- Modularization is a very powerful influencer.
- Together with the corresponding *encapsulation* it reduces the *relational complexity* of the ensemble of objects on which modularization works.
- The encapsulation keeps most relations internal to the module.
- When relations between modules are reduced to a few types , then the module becomes *reusable*.
- If modules can be *configured from lower order modules*, then efficiency grows exponentially.

Modularization

- Elementary particles can be considered as the lowest level of modules. All composites are higher level modules.

- Modularization uses resources efficiently.

- When *sufficient resources* in the form of reusable modules are present, then modularization can reach enormous heights.

- On earth it was capable to generate *intelligent species*.

Complexity

- *Potential complexity* of a set of objects is a measure that is defined by the number of potential relations that exist between the members of that set.

- If there are n elements in the set,
then there exist n·(n-1) potential relations.

- *Actual complexity* of a set of objects is a measure that is defined by the number of relevant relations that exist between the members of the set.

- *Relational complexity* is the ratio of the number of actual relations divided by the number of potential relations.

Relations

- Modules connect via interfaces.
- Relations that act within modules are lost to the outside world of the module.
- Interfaces are collections of relations that are used by interactions.
- Physics is based on relations. Quantum logic is a set of axioms that restrict the relations that exist between quantum logical propositions.

Types of physical interfaces

- Interactions run via (relevant) relations.
- Inbound interactions come from the past.
- Outbound interactions go to the future.
- Two-sided interactions are cyclic.
  - They take at least two progression steps.
  - They are either oscillations or rotations of the inter-actor.
- Cyclic interactions bind the corresponding modules together.

Modular systems

- Modular (sub)systems consist of connected modules.
- They need not be modules.
- They become modules when they are encapsulated and offer standard interfaces that makes the encapsulated system a reusable object.

- All composites are modular systems

Binding in sub-systems

- Let ψ represent the renormalized superposition of the involved distributions.

  - $\nabla\psi = \phi = m\,\varphi$
  - $\int_V |\psi|^2\,dV = \int_V |\varphi|^2\,dV = 1$
  - $\int_V |\phi|^2\,dV = m^2$

- m is the total energy of the sub-system

- The ***binding factor*** is the total energy of the sub-system minus the sum of the total energies of the separate constituents.

Random versus intelligent design

- At lower levels of modularization nature designs modular structures in a stochastic way.
  - This renders the modularization process rather slow.
  - It takes a huge amount of progression steps in order to achieve a relatively complicated structure.
  - Still the complexity of that structure can be orders of magnitude less than the complexity of an equivalent monolith.
- As soon as more intelligent sub-systems arrive, then these systems can design and construct modular systems in a more intelligent way.
  - They use resources efficiently.
  - This speeds the modularization process in an enormous way.

Fundamental particles

- Due to color confinement some elementary particles cannot be created as individuals
- Quarks can only be created combined in hadrons
- Fundamental particles form a category of particles that are created in one integral action
- The color charge of fundamental particles is neutral

Other subjects

Dual space distributions

- A subset of the (quaternionic) distributions have the same shape in configuration space and in the linear canonical conjugated space.

- We call them dual space distributions

- These are functions that are invariant under Fourier transformation.

- The Qpatterns and the harmonic and spherical oscillations belong to this class.

- Fourier-invariant functions show iso-resolution, that is, $\Delta_p = \Delta_q$ in the Heisenberg's uncertainty relation.

Why has nature a preference?

- Nature seems to have a preference for this class of quaternionic distributions.

- A possible explanation is the two-step generation process, where the first step is realized in configuration space and the second step is realized in canonical conjugated space.

- The whole pattern is generated two-step by two-step.

- The only way to keep coherence between a distribution and its Fourier transform that are both generated step by step is to generate them in pairs.

Conclusion

- Fundament
  - Quantum logic
  - Book model
  - Correlation vehicle
- Main features
  - Fundamentally countable $\Rrightarrow$ Quanta
  - Embedded in continuum $\Rrightarrow$ Fields
  - Fundamentally stochastic $\Rrightarrow$ Quantum Physics
  - Palestra is curved
  - Quaternionic metric $\Big\}$ $\Rrightarrow$ Quaternionic "GR"

Conclusion

- Contemporary physics works (QED, QCD)
- But cannot explain fundamental features
  - Origin of dynamics
  - Space curvature
  - Inertia
  - Existence of Quantum Physics
  - What photons are

End

- Physics made its greatest misstep in the thirties when it turned away from the fundamental work of Garret Birkhoff and John von Neumann.

- This deviation did not prohibit pragmatic use of the new methodology.

- However, it did prevent deep understanding of that technology because the methodology is ill founded.

Navigate

To Logic Systems slides:
http://vixra.org/abs/1302.0122

To start of Hilbert Book Model slides:
http://vixra.org/abs/1302.0125

To Hilbert Book Model slides, part 3
http://vixra.org/abs/1309.0018

To "Physics of the Hilbert Book Model"
http://vixra.org/abs/1307.0106