Informational nature of nonlocal self-organizations and fundamental forces

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The field distribution of mass and charge according to Shannon's information law in a noisy environment can reinterpret the phenomenon of long-range interaction by nonlocal self-organization of continuous densities of matter. Correlations of tensor stresses in such a Cartesian matter-space are instantaneous, as is the reduction of the wave function for macro-quantum entanglement after the appearance of dissipation or measurements. The implications of the monistic modification of Einstein's and Maxwell's theories instead of the dual modeling through particles and their fields can be discussed quantitatively. For QCD, the referents of information theory and the consistent transition to the monistic omnipresence of field matter without the void can also be expected.

Open Access Concept Paper

Coulomb Force from Non-Local Self-Assembly of Multi-Peak Densities in a Charged Space Continuum

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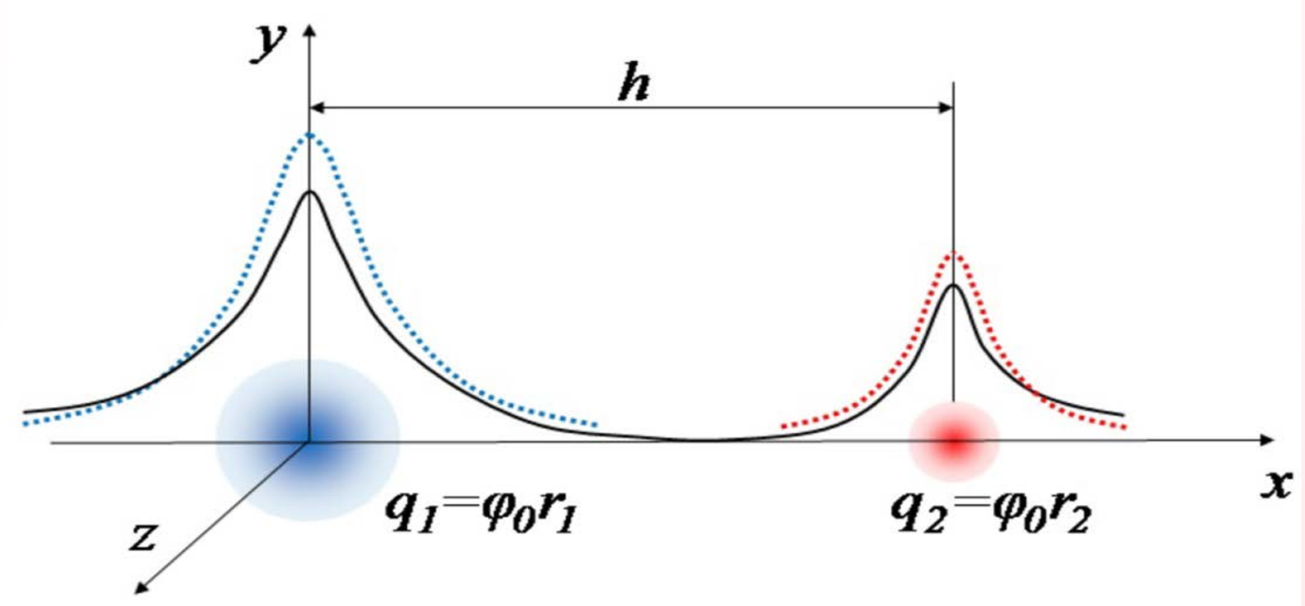

$$W_{met} = -\varphi_0 ln\left(1+\sum \sqrt{G}m_k/|\mathbf{x}-\mathbf{a}_k|\varphi_0\right)$$

Local potential W(**x**) in the continuous charge corresponds to the Shannon information rate

$$W_{sys}(\mathbf{r},\mathbf{h}) = \varphi_o \ln\left(1+\frac{r_1}{|\mathbf{r}|}+\frac{r_2}{|\mathbf{r}-\mathbf{h}|}\right)$$

$$\mathbf{E}_{sys}(\mathbf{h}) \equiv -\nabla W_{sys}(\mathbf{h}) = \frac{\varphi_o}{1+\frac{r_1}{|\mathbf{r}|}+\frac{r_2}{|\mathbf{r}-\mathbf{h}|}}\left(\frac{\mathbf{r}r_1}{|\mathbf{r}|^3}+\frac{(\mathbf{r}-\mathbf{h})r_2}{|\mathbf{r}-\mathbf{h}|^3}\right) \equiv \mathbf{E}_1+\mathbf{E}_2$$

$$\begin{cases} \int \frac{d^3x}{4\pi}\mathbf{E}_1^2 + \int \frac{d^3x}{4\pi}\mathbf{E}_1\mathbf{E}_2 = \varphi_o^2 r_1\left(1-\frac{r_2}{h}\right)+\frac{\varphi_o^2 r_1 r_2}{h} = q_1\varphi_o = const,\ r_1,r_2 \ll h \to \infty, \\ \int \frac{d^3x}{4\pi}\mathbf{E}_1^2 + \int \frac{d^3x}{4\pi}\mathbf{E}_1\mathbf{E}_2 = \frac{\varphi_o^2 r_1^2}{r_1+r_2}+\frac{\varphi_o^2 r_1 r_2}{r_1+r_2} = q_1\varphi_o = const,\ r_1,r_2 \gg h \to 0. \end{cases}$$

$$\rho_{q_{sys}} \equiv \frac{\mathbf{E}_1^2}{4\pi\varphi_o}+\frac{\mathbf{E}_1\mathbf{E}_2}{2\pi\varphi_o}+\frac{\mathbf{E}_2^2}{4\pi\varphi_o} = \frac{\varphi_o\left(\frac{r_1^2}{|\mathbf{r}|^4}+\frac{2r_1r_2\mathbf{r}(\mathbf{r}-\mathbf{h})}{|\mathbf{r}|^3|\mathbf{r}-\mathbf{h}|^3}+\frac{r_2^2}{|\mathbf{r}-\mathbf{h}|^4}\right)}{4\pi\left(1+\frac{r_1}{|\mathbf{r}|}+\frac{r_2}{|\mathbf{r}-\mathbf{h}|}\right)^2}$$

$$F^x_{\Omega_1} = \int_{\Omega_1}\rho_{sys}E^x_{sys}dxdydz = \int_{\Omega_1}\frac{dxdydz}{4\pi\varphi_o}(\mathbf{E}_1^2+2\mathbf{E}_1\mathbf{E}_2+\mathbf{E}_2^2)(E_1^x+E_2^x) \approx$$
$$\int_{\Omega_1}\frac{dxdydz}{4\pi\varphi_o}(\mathbf{E}_1^2E_1^x+2\mathbf{E}_1\mathbf{E}_2E_1^x+\mathbf{E}_1^2E_2^x) = -\frac{\varphi_o^2r_1r_2}{h^2}\left(\frac{1}{6}+\frac{1}{3}+\frac{1}{2}\right) = -\frac{q_1q_2}{h^2}.$$

Conclusion: Coulomb force is a consequence of information theory for non-local distributions of non-dual field-matter. The same for Newton's gravitational force and other fundamental interactions.

- **Monism of Nonlocal Matterspace with Instant All-Unity Instead of Particle–Field Duality with Retarded Interactions. 2023. DOI: 10.3390/ECU2023-14031**
- **Teach Newton's theory as the simplest model for the nonlocal organization of Cartesian matter-extension. 2022. DOI: 10.1142/9789811258251_0189**
- **Metric inertia for eddy densities of nonlocal matter-space. 2021. DOI: 10.1080/14685248.2021.1953698**