More is Different Emergence of Gravity and Dark Energy/Matter

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NASA WMAP

- This new data shows the existence of exotic cosmic torsion vacuum fields that account for ~ 95% of the "stuff" of the universe. Local control of these exotic vacuum torsion fields are of profound importance to the immediate future and survival of life in the universe.

Physics Today

- The standard particle model is not as parsimonious as anyone would like with perhaps 18 "effective field" fudge factors like Ptolemy's epicycles. They can only be explained by the Weak Anthropic Principle in an infinity of dynamic Hubble sphere parallel universes out of causal contact with each other on a single post-inflation bubble in an infinity of bubbles. It is the worst theory we have except for every other! ☺

Action Principle

- Physicists can always be counted upon to do the right thing after they have exhausted every other alternative. ☺

Micro Quantize Gravity?

- V. Ambegoakar: "Is it not a rather large extrapolation to apply quantum mechanics to the universe as a whole? Is there some evidence that this is a justified or prudent assumption?"

- P.W. Anderson: "No, there is no evidence. So far [1986] there is, in fact , a disturbing absence of evidence … It is hard to know whether the phenomenon of inflation, is to be considered as a confirmation or a further puzzle and … there is the strange question of the cosmological constant."

Dirac Vacuum BCS Unstable

- Virtual electron-positron pairs at edge of Fermi sphere pair off under their mutual Coulomb attraction to form the vacuum condensate $(0|e^+(x)e^-(x)|0)$.

- The effective field action for the vacuum condensate has inflation Landau-Ginzburg "Mexican Hat" Goldstone-Higgs potential and covariant "generalized phase rigidity" (P.W. Anderson's "More is different." in "A Career in Theoretical Physics", World Scientific)

Goldstone Phase $\rightarrow$ Gravity

- $<g_{\mu\nu}(x)> = \eta_{\mu\nu} + (L_p{}^2/2)\{D_\mu D_\nu + D_\nu D_\mu\}$arg $(0|e^+(x)e^-(x)|0)$ = strain tensor of Hagen Kleinert's "world crystal" precipitate http://www.physik.fu-berlin.de/~kleinert/.

- $L_p{}^2 = hG/c^3$ Bekenstein BIT

- $L_p \rightarrow L_p{}^{2/3} L^{1/3}$? if "world hologram"

- $D_\mu =, {}_\mu - (2e/hc)A_\mu$ $U(1)_{em}$ gauge covariant

Higgs $\rightarrow$ Dark Energy/Matter

$\square$ $\Lambda(x)_{zpf} = L_p{}^{-2}[1 - L_p{}^3 \mid (0|e^+(x)e^-(x)|0)|^2]$

- G. E. Volovik's idea (gr-qc/0302069) is that the equilibrium physical vacuum is non-gravitating, i.e. 0 micro-quantum *zero point pressure*, therefore with $< \Lambda(x)_{zpf} >_{eq} = 0$

$\square$ $\Lambda(x)_{zpf} > 0$ is anti-gravitating "dark energy"

$\square$ $\Lambda(x)_{zpf} < 0$ is gravitating "dark matter"
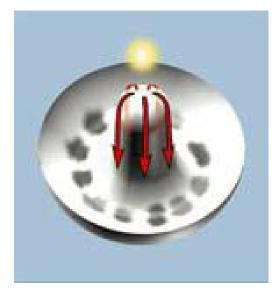
Einstein's Local Field Equation

- $\langle G_{\mu\nu}\rangle + \Lambda_{zpf}\langle g_{\mu\nu}\rangle = -(8\pi G/c^4)\langle T_{\mu\nu}\rangle$

- $\langle G_{\mu\nu}\rangle^{;\nu} + \Lambda_{zpf}{}^{,\nu}\langle g_{\mu\nu}\rangle = -(8\pi G/c^4)\langle T_{\mu\nu}\rangle^{;\nu}$

- $\langle G_{\mu\nu}\rangle^{;\nu} = 0$ *zero torsion* Bianchi identities $\rightarrow \Lambda_{zpf}$ is constant and uniform in vacuum defined as $\langle T_{\mu\nu}\rangle = 0$.

- $\langle G_{\mu\nu}\rangle^{;\nu} =/= 0$ non-zero torsion allows variable $\Lambda(x)_{zpf}$ in vacuum as now observed in NASA WMAP.

Metric Engineering the Vacuum?

- Set $<T_{\mu\nu}(x)> = 0$ in "vacuum"

- Assume torsion $=/= 0$ as now observed in WMAP.

- $<G_{\mu\nu}(x)> + \Lambda(x)_{zpf} <g_{\mu\nu}(x)> = 0$

- Control *variable local* $\Lambda(x)_{zpf}$ via Bohm-Aharonov and Berry phase modulation in Josephson weak link of real superconductor $(g|e^-e^-|g)$ with macro-quantum vacuum $(0|e^+e^-|0)$ in covariant nonlinear Landau-Ginzburg partial differential equation?

Landau-Ginzburg Equation

- $\{[^{;\mu} - 2eA^{\mu}/hc][_{;\mu} - 2eA_{\mu}/hc] + M^2 + |(0|e^+e^-|0)|^2 \beta\}(0|e^+e^-|0) = 0$

- $M^2 < 0, \beta > 0$ Mexican Hat Potential
  http://www.americanscientist.org/articles/00articles/ganguicap4.html

Vacuum Weak Link?

- $\{[^{;\mu} - 2eA^{\mu}/hc] [_{;\mu} - 2eA_{\mu}/hc] + M^2 + |(0|e^+e^-|0) + (g|e^-e^-|g)|^2 \beta\}[(0|e^+e^-|0) + (g|e^-e^-|g)] = 0$

- C^3 *warp drive* modulation cross term is

- $\sim |(0|e^+e^-|0)||(g|e^-e^-|g)|\cos[\arg(0|e^+e^-|0) - \arg(g|e^-e^-|g) + \phi_{magnetic} + \phi_{Berry} + \phi_{Lense\text{-}Thirring} + ?]$

In the Heart of Dark Matter Apocalypse Now?

- "Why not go to a lower vacuum here and now? … It was a very frightening experience which I had when I first thought about these bubbles … I really shivered … I told Andrei Sakharov about these bubbles. I vividly remember his reaction. He said: 'Such theoretical work should be forbidden. It's too dangerous.'"

- Lev. B. Okun hep-ph/0112032

http://www.1stbooks.com

http://stardrive.org