1. **Nature of the Vacuum as an Informational Framework:  
   Question:** If the vacuum is defined as dimensionless and purely informational, how do we reconcile this with its quantum properties, such as zero-point energy or particle-antiparticle fluctuations, which are traditionally considered "physical" phenomena?

**Potential Gap:** The transition from "informational" to "physical" states may require a more formalized mechanism to avoid ambiguity.

1. **Modulation and Resonance Principles:  
   Question:** How does the modulation of constants like ℎ h, 𝑐 c, and 𝐺 G lead to specific physical phenomena, such as particle formation or energy quantization?

**Potential Inconsistency:** Without a defined mechanism, "modulation" risks becoming a metaphor rather than a rigorously defined process.

1. **Energy and Information Connection:  
   Question:** While energy as "measurable information modulation" is compelling, how does this align with existing definitions in thermodynamics, quantum mechanics, and relativity?

**Potential Gap:** Bridging the conceptual gap between classical and quantum definitions of energy and the new informational perspective.

1. **Physical Constants as Informational Rules:  
   Question:** If constants like ℎ h, 𝑐 c, and 𝐺 G are latent informational rules, are they static or dynamic? Can they themselves modulate, or are they immutable?

**Potential Inconsistency:** If constants are immutable, how does the framework account for vacuum fluctuations that appear dynamic?

1. **Dual-Layer Framework:  
   Question:** How does the duality between phase-layer modulation (non-local) and group-layer oscillations (local) resolve long-standing paradoxes, such as wave-particle duality or entanglement?

**Potential Gap:** The connection between the layers and observable quantum phenomena needs a stronger explanatory bridge.

1. **Relativistic Implications:  
   Question:** If energy emerges from vacuum modulations, how do relativistic effects like time dilation and space contraction interact with this framework?

**Potential Doubt:** Without explicit treatment, it may seem disconnected from the relativistic view of spacetime as dynamic and energy as a property of its curvature.

1. **Cosmological Constant ( Λ Λ):  
   Question:** The hypothesis that Λ Λ governs vacuum resonance rates and energy density is intriguing, but how does this fit with the observational role of Λ Λ in cosmic acceleration?

**Potential Gap:** The relationship between vacuum energy, Λ Λ, and the expansion of spacetime needs deeper integration with modern cosmological models.

1. **Mathematical Formalism for Modulation and Energy Emergence:  
   Question**: Can this framework provide predictive power through equations or models that describe energy emergence and transformations?

**Potential Doubt:** Without formalism, it may remain conceptual rather than testable.

1. **Philosophical and Conceptual Boundaries:  
   Question:** If the vacuum is the "God of the framework" (paraphrasing Sagan), does this imply a deterministic system or one with inherent randomness?

**Potential Ambiguity:** The role of chance and determinism in vacuum modulations is not fully addressed.

1. **Refining the Definition of Energy:**  
   The current definition of energy as a **"measurable manifestation of modulated information"** is compelling but leaves some questions:

**Measurement Context:** What are the parameters for measuring energy in quantum, relativistic, and classical systems?

**Forms of Manifestation:** How do we link modulation to specific forms of energy (e.g., kinetic, potential, thermal)?

It all comes down to answer three questions.

Mechanism for modulation. Where to start? I see thermodynamics as the effect of physical manifestation, the result from radiation after the emergence of physical phenomena. How could this process be analysed in reserve to explain the mechanism of modulation?

First we have to define what it means dimensionless physics constant values in free space. It doesn't make reason to look for a structure, since it is dimensionless and physically empty. Though this description of free space doesn't seem to limit understanding that these physical values are unstructured and pertinent to free space regardless of scale. That says that we can comprehend that this description applies universally, everywhere, at all times.

Then it comes to figure out the mechanism which brought physical radiation manifestation, heat and thermodynamics. It is unthinkable to see the initial free space infinite and endless without limits, or the least this set of physics constant must have coherently coalesced as one part of free space. With this in mind we can analyse how or to what extent this phenomena become dimensional unstable, by any or many physical reasons, creating changes, modulation of the physics constant values outside their stable state.

That is my introduction to an answer to the mechanism to vacuum physics constant spontaneous values modulation. Is it reasonable? Could be made comprehensible?

Second, Role of the Physics Constants. The fluctuation of vacuum constant does not happen on the vacuum per se, the limits set by these constants remain constant coherently as part of free space. However these very limits once reached certain thresholds induces the appearance of physical resonance oscillation with modified values interaction, ergo physical manifestation of energy, force and matter.  
I will leave you to answer your third question from this explanation.