Curvature-Tunable Absorbance in Graphene: A Quarkbase-Cosmology Prediction

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Within the framework of *Quarkbase Cosmology*, electromagnetic propagation arises from longitudinal pressure waves of a frictionless etheric plasma (Ψ-field). This theory predicts that the universal optical absorbance of monolayer graphene ($A \approx \pi\alpha$) should vary linearly with biaxial strain or mean curvature, due to changes in the local density of etheric pressure channels that guide the propagation of light. The expected dependence is

$$\Delta A/A \simeq 10^{-3}\text{–}10^{-2} \text{ per \% strain.}$$

Verification of this small but measurable effect would provide a direct falsifiable test of the Quarkbase description of electromagnetic phenomena as pressure dynamics in an incompressible etheric medium.

INTRODUCTION

The measured absorbance of monolayer graphene, $A = \pi\alpha \approx 2.3\%$, is generally considered a universal constant determined solely by the fine-structure constant [1, 2]. In Quarkbase Cosmology, however, this universality holds only for flat and strain-free geometries. Curvature modifies the local configuration of the Ψ-field, changing the effective coupling α and thus the absorbance.

THEORETICAL FRAMEWORK

The Quarkbase field is governed by

$$(\nabla^2 - \lambda^{-2})\Psi = -\alpha \sum_i \delta(\boldsymbol{x} - \boldsymbol{x}_i), \tag{1}$$

where each quarkbase acts as a compact source of pressure displacement. For a curved or strained surface, the coupling constant becomes geometry-dependent:

$$\alpha(\varepsilon) = \alpha_0(1 + \kappa\,\varepsilon), \tag{2}$$

with ε the local biaxial strain and $\kappa \sim 10^{-2}$–10^{-3} a dimensionless curvature–absorbance coefficient. Thus, the predicted optical response is

$$A(\varepsilon) = \pi\alpha_0(1 + \kappa\,\varepsilon), \tag{3}$$

a direct linear modulation of the absorbance by strain.

EXPERIMENTAL PROPOSAL

The proposed test requires no cryogenics or magnetic fields:

- Fabricate monolayer graphene on a flexible polymer or on nanobubble domes of known radius.
- Map absorbance $A(\varepsilon)$ by micro-ellipsometry (400–800 nm) while measuring curvature via AFM.
- Compare with adjacent flat regions to obtain relative change $\Delta A/A$.

Detecting a slope $\kappa \approx 10^{-2}$ per % strain is within the precision of current optical instrumentation.

SIGNIFICANCE

Current literature assumes perfect universality of $A = \pi\alpha$ [1, 2]. Detection of even a small curvature dependence would falsify that assumption and support the Quarkbase interpretation of the electromagnetic field as a manifestation of pressure in a continuous etheric plasma. A null result would instead place an upper bound on the coupling coefficient κ, constraining the ratio β/ρ_p of the etheric rigidity to its pressure density.

CONCLUSION

The curvature–tunable absorbance of graphene constitutes a precise and falsifiable prediction. Confirmation would establish the first experimental evidence of etheric pressure dynamics as the physical substrate underlying electromagnetism.

[1] R. R. Nair *et al.*, Science **320**, 1308 (2008).
[2] K. F. Mak *et al.*, Phys. Rev. Lett. **101**, 196405 (2008).

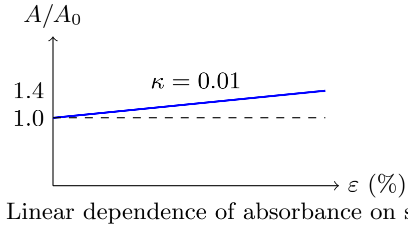

FIG. 1. Linear dependence of absorbance on strain.