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Research Article

Formualtion of the Wave-Function Interference with Entropy Change in Quantum System, after an Atomic Collapse Initiated by Uranium, Medicated by a Graphene-Gold Nanoparticle (AuNP) Composite

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Abstract

Colloid gold with camostat mesilate powder can disappear the tumor mass by the pair annihilation (atomic collapse of the graphene with AuNP) and inhibiting the chraomatin remodelling. Combination of NaCl + KCl solution (atomic collapse of the graphene with heavy nucleus) and colloid gold with camostat mesilate powder can induce the destructive / constructive interference waveform to re-appear the disease [1]. Here, we report the mathematical formualtion of the destructive / constructive interference, in the viewpoint of the entropy.

Keywords: destructive / constructive interference; entropy; atomic collapse; uranium; graphene-AuNP

Introduction

Atomic Collapse is a relativistic quantum phenomenon, typically occurring when the Coulomb potential becomes supercritical, such as when an atomic nucleus has $Z \gg 1$ (e.g., uranium with $Z = 92$). In graphene, this can be simulated at much lower effective charges due to its Dirac-like dispersion. Graphene can support surface plasmons, and gold nanoparticles enhance electromagnetic fields locally due to localized surface plasmon resonance (LSPR). Constructive or destructive interference in this context can refer to the interference of wavefunctions, or more likely, interference of scattered electromagnetic/plasmonic fields [2,3].

Results

Mathematical expression of denoting the plasmonic wavefunction or scattered field amplitude from each component:

$E_g(\vec{r},t)$: Electric field amplitude scattered from graphene.

$E_{Au}(\vec{r},t)$: Scattered field from the gold nanoparticle.

$\phi_U(\vec{r},t)$: Potential (or wavefunction) perturbation due to uranium-induced atomic collapse.

Interference can be expressed through the total electric field:

$$E_{total}(\vec{r},t)=E_g(\vec{r},t)+E_{Au}(\vec{r},t)+\delta E_{\phi U}(\vec{r},t)$$

Where $\delta E \phi U$ is the modification of the field due to atomic collapse, often modeled via a perturbed potential or boundary condition.

To assess interference, analyze the phase relationship:

Assume time-harmonic fields:

$$E_i(\vec{r},t)=A_i(\vec{r})eE\_^{i(\vec{k}i \cdot \vec{r}-\omega t+\phi i)}$$

Therefore, constructive interference occurs when:

$$\Delta\phi=\phi_g-\phi_{Au}=2\pi n, n\in Z$$

Destructive interference when:

$$\Delta\phi=\phi_g-\phi_{Au}=(2n+1)\pi$$

The atomic collapse affects the local density of states (LDOS) and shifts these phases via:

$$\phi i -> \phi i+\delta\phi(\vec{r})$$

$$\text{Where } \delta\phi(\vec{r}) \propto \int V_{collapse}(\vec{r}\,')\, G(\vec{r},\vec{r}\,')\, d\vec{r}\,'$$

Constructive or destructive interference depends on $\Delta\phi(\vec{r})$, which is shifted due to uranium's strong Coulomb potential in the graphene-AuN Phybrid system, this can result in enhanced or suppressed field intensities depending on geometry and energy levels Talking about interference in terms of entropy, we're often referring to how coherence (i.e., ability of quantum systems to interfere) is related to entropy,

which measures disorder or information loss.

Constructive interference -> more coherence -> lower entropy

Destructive interference -> loss of coherence ->higher entropy

In quantum systems, von Neumann entropyis commonly used:

S=−Tr(ρlog)ρ, where ρ is the density matrix of the system.

Discussion

Composite State Density Matrix the total system be made of graphene field: ρg. gold nanoparticle field: ρAu and perturbation from uranium collapse: ρU. If these subsystems are entangled or interacting coherently, the total density matrix isn't just a tensor product and it contains interference terms:

$$\rho_{total}=\rho_g+\rho_{Au}+\rho_U+\rho i_{nterference}$$

where, ρinterference= ∑i≠jγij∣ψi⟩⟨ψj∣

Here, γ i j encodes the coherence between subsystems (related to phase differences), and these off-diagonal terms are responsible for interference.

Entropy With and Without Interference

With interference (coherent):

$$S_{coh}=-\mathrm{Tr}(\rho_{total}\log\rho_{total})$$

Without interference (incoherent) removing off-diagonal terms ρ diag

$$S_{incoh}=-\mathrm{Tr}(\rho_{diag}\log\rho_{diag})$$

thus, interference affects entropy via:

ΔS=Sincoh−Scoh≥0

A strong constructive interference (coherent state) minimizes entropy.

A strong destructive interference (incoherence or decoherence) maximizes entropy.

Collapse-Induced Entropy Shift

The atomic collapse due to uranium affects the Coulomb potential, which perturbs the system wavefunctions and changes phase relationships is leading to changes in ρ, and hence in entropy.

Vcollapse $(\vec{r})$ is the perturbation potential and the entropy change due to atomic collapse as:

$$\delta S=S[\rho_{total}(V_{collapse})]-S[\rho_{total}(0)]$$

This function captures how the collapse modifies interference and thus the information entropy of the system.

$$\delta S=-\mathrm{Tr}[\rho(V_{collapse})\log\rho(V_{collapse})]$$

where:

ρ(Vcollapse) contains interference modifications (i.e., phase shifts, decoherence) due to uranium collapse.

A positive δS implies destructive interference (increased disorder) and a negative δS (rare, usually in engineered coherence) implies constructive interference [4].

Conclusion

In summary, the constructive /destructive wavefunction interference is ocurred after an atomic collapse initiated by NaCl +KCl, medicated by a graphene-gold nanoparticle (AuNP) composite. The interference pattern after collapse can be described mathematically as:

$$I(\vec{r})=|E_{total}(\vec{r},t)|^2=|E_g+E_{Au}+\delta E_{\phi U}|^2$$

Where: δEϕU incorporates the collapse potential.

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