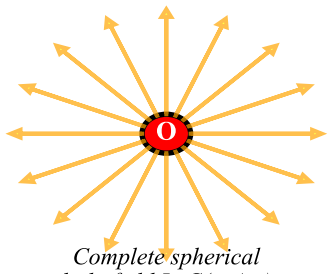
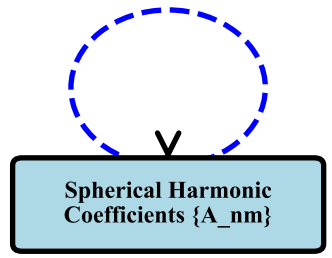
Figure 6: Light Field Equivalence Positioning Mechanism

(A) Step 1: Field Capture

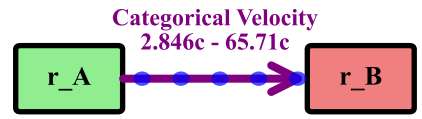


Complete spherical light field L_C(r_A, t)

(B) Step 2: Decomposition

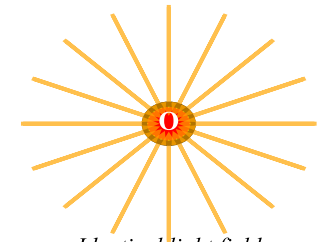


(C) Step 3: Transmission



Pattern information transfer via triangular amplification

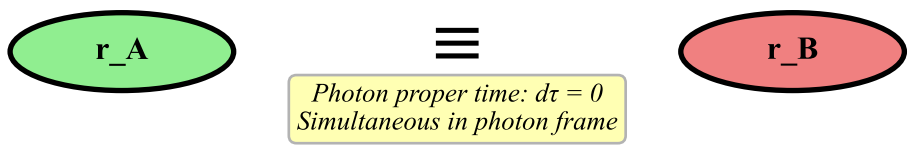
(D) Step 4: Recreation



Identical light field L_C(r_B, t) = L_C(r_A, t)

(E) Photon Reference Frame Equivalence

L_C(r_A, t) = L_C(r_B, t) → Equivalent electromagnetic properties



(F) Mathematical Framework

LIGHT FIELD EQUIVALENCE PRINCIPLE

Complete Spherical Light Field:

$$L_C(\mathbf{r}, t) = \oint_{4\pi} I(\theta, \phi, \mathbf{r}, \lambda, t)\, d\Omega$$

Spherical Harmonic Decomposition:

$$L(\theta, \phi, r, t) = \sum_{l=0}^{\infty} \sum_{m=-l}^{l} A_{lm}(r, t) Y_l^m(\theta, \phi)$$

Pattern Transmission:

$$\mathcal{T}: L_C(\mathbf{r}_A, t) \rightarrow L_C(\mathbf{r}_B, t + \Delta t)$$

Equivalence Condition:

$$L_C(\mathbf{r}_A, t) = L_C(\mathbf{r}_B, t)\ \forall t$$

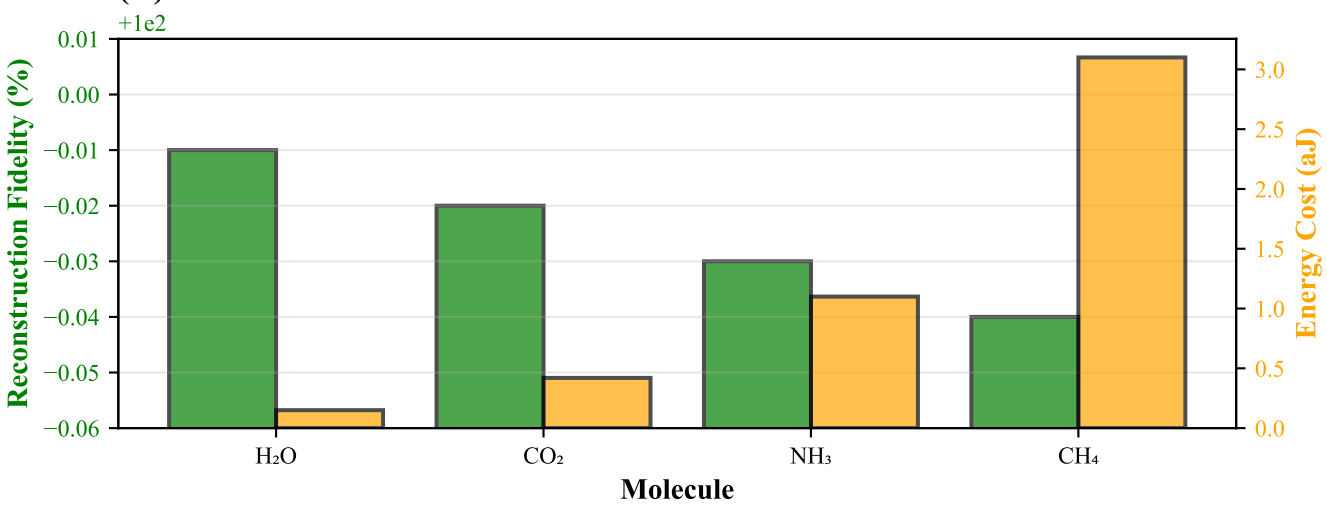
Photon Proper Time:

$$d\tau = dt\sqrt{1 - v^2/c^2} = dt\sqrt{1 - c^2/c^2} = 0$$

POSITIONING VIA FIELD RECREATION

Result: Identical electromagnetic environments at both locations enable positioning via field equivalence

(G) Performance Metrics



(H) Key Results

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Mechanism:
  ✓ Capture complete spherical light field
  ✓ Decompose into spherical harmonics
  ✓ Transmit pattern at categorical velocity
  ✓ Recreate identical field at target
  ✓ Field equivalence enables positioning

Performance:
  ✓ Transfer times: nanosecond scale
  ✓ Reconstruction fidelity: >99.96%
  ✓ Energy costs: 0.15 - 3.1 aJ
  ✓ Categorical velocities: 2.846c - 65.71c

Applications:
  ✓ Molecular-scale transfer (demonstrated)
  ✓ Extended distance positioning (calculated)
  ✓ Advanced communication (theoretical)

Theoretical Basis:
  ✓ Photon reference frame (dτ = 0)
  ✓ Electromagnetic field equivalence
  ✓ Triangular amplification mechanism
```