EN_3: 3S+T Geometry and Determinism in Einstein-VED

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1. Axiomatic critique of uncertainty

- Quantum mechanics (QM) is based on uncertainty as a fundamental property.
- It is argued that this uncertainty only reflects **observer ignorance**, not an intrinsic property of reality.
- Postulate: **velocity expresses the dependence between space and time**:
    - $v = 0$: space and time independent.
    - $v \neq 0$: space and time dependent.
    - $v = c$: total dependence ($ds = dt$ in natural units).
- Consequence: the **structural non-separability of variables** (position and momentum) invalidates Heisenberg's basis.

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2. Determinism vs indeterminism

- Indeterminacy arises within space-time, because the function f of each point is defined by its past.

- f is completely determined by the past light cone and cannot alter the past.
- For $t \geq t_0$ (future), f is not defined: the future does not condition the past.
- Freedom: ignorance of the future allows choosing actions without the past being altered.

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3. Geometry of 3S+T space-time

- It arises from the Minkowski metric ($-\ +\ +\ +$):

$$ds^2 = -dt^2 + dx^2 + dy^2 + dz^2$$

- Natural units: $c = 1$, making space and time compatible.
- Differential Lorentz transformations:

$$dx' = \gamma(dx - vdt), \quad dt' = \gamma(dt - vdx)$$

- Velocity as a measure of dependence:

$$v = ds / dt$$

3.1 Emergence of space

- Space arises from the **quadratic difference of relative times**:

$$ds^2 = dt^2 - (dt')^2$$

- Each point of space-time has a function f that depends on its causal past, determining present and future.

- Independence of variables (position and momentum) **does not exist structurally**.

3.2 Proper time and space at $v \to c$

- For particles at limiting speed:

$$dt' \to 0, \quad ds' \to 0$$

- Proper time and space cease to flow from the external perspective, reinforcing total dependence.
- The light cone continues to delimit causality and the function f remains coherent.

3.3 Antipodal particles and entanglement

- Particles at opposite positions on a wavefront satisfy the structural dependence.
- There is no superluminal action or wave collapse.
- What QM calls "entanglement" is a consequence of 3S+T geometry and the function f.

3.4 Choice of metric and dual universes

- Metric $(-+++)$: time special, facilitates causality and ds / dt.
- Metric $(++++)$: equivalent dimensions, interpretable as complex numbers:

$$(t, i, j, k)$$

- Dual real/imaginary universe, maintaining coherence and allowing generalizations.

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4. Conclusion

- Space and time are independent only for $v = 0$; otherwise, they are structurally dependent, measured by $v = ds / dt$.
- The function f defines all of 3S+T deterministically.
- Entanglement and antipodal phenomena explained without chance or collapse.
- This framework constitutes a **new physics**, overcoming limitations of quantum mechanics and opening new conceptual windows.

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