A continuum theory that demands an unmeasurable and therefore unphysical element – a singularity – is no more complete than a quantum theory that depends on nonlocality.

There are research results in interdisciplinary science – e.g. complex systems, chaos theory, artificial intelligence, theory of computation – as well as information theory itself, and topological quantum information theory that strongly point to a quantum continuum theory, without nonlocality.

A continuous function – in mathematics as well as physics, avoids the singularity. We are used to thinking that the singularity of general relativity is a limitation of the theory to describe physics past the Planck limit. Were the Planck limit of Lebesgue measure zero at the local domain, however, it would go to infinity globally – based on the choice of local $S^3$ topology. That is, all possible results on the $S^3$ equator being $(+1, -1, i)$ – information in the form of these results when projected to a 2-dimension domain of the Hilbert space is all positive real:

$$(+1, -1, i)^2 = (+1, +1, -1)$$

If we translate this result to $C^*$, we get four “beables,” to borrow terminology from J.S. Bell:

$$\{+1, +1, -1, \infty\}.$$  

When Bell formulated his measurement criteria, it was on the closed interval $[-1, +1]$ in the open set $\{-\infty, +\infty\}$

Obviously, the point at infinity for the $C^*$ (i.e., $S^3$ manifold) topology shows up in all possible commutative configurations as:

$$\begin{cases} 
+1, -1 & -1, \infty & -1, 1 \\
+1, \infty & +1, 1 & \infty, \infty
\end{cases}$$
Allowing reversibility, of the only real observables — \{+ 1, - 1\}, \{- 1, - 1\}, \{+ 1, - 1\} \rightarrow \{+ 1, - 1\} alone is orientable. In other words, a pair of observers A & B – just as Bell-Aspect & CSHS results show – can only correlate their measurement results at most ¾ of the time if they cooperate in their choices of variables that correlate randomly on an upper bound of ½, because no 4th choice is real.

Bell, realizing that infinity is not a number, a beable, saw combinations of

\[
\begin{align*}
{+ 1, - 1} & \quad {- 1, \infty} & \quad {- 1, - 1} \\
{+ 1, \infty} & \quad {+ 1, + 1} & \quad {- \infty, + \infty}
\end{align*}
\]

Same result?

One critical difference shows why the choice of topology changes the interpretation:

Bell tacitly assumes that infinity is orientable by the observer’s choice of direction. That is only true, however, on the plane or the 3-manifold. General orientability is a topological property – realized in the simplest representation of the Riemann sphere \(S^3\), which is a \(C^*\) compactification of \(R^3\) (Bell’s domain) with a single point at infinity. So the signs attached to \(+ \infty, - \infty\) as if infinity could be treated as a number, are not present in a topological continuum.

Again, the only results on the equator of \(S^3\) are \(+ 1, - 1, i\). No infinity – though calculation will send a result either to infinity or to the equator, which is a continuous representation of \(S^2 \times S^2\):

\[
\begin{array}{c}
\infty \\
\downarrow \\
S^2 \quad \times \\
\downarrow \\
S^2 \quad \text{equator of } S^3 \\
\infty
\end{array}
\]
Which is the $S^3$ manifold, i.e., a 3-ball embedded in the 4-dimension space. Results that go to infinity are compelled to the Lebesgue measure on $\mathbb{R}$, the 1-dimension embedding of $S^0$, in topological terms.

The Bell domain $\mathbb{R}^3$ treats $S^3$ not as a continuous line embedded in $S^3$ but as the real number line limited to discrete arithmetic functions on the plane, and oriented in $\mathbb{R}^3$ by fiat – thus, the impression in Bell-CSHS that reality is fundamentally observer-created – and dependent on the free choice of orientation of the observer – while the point at infinity is actually singular and not reversible on the line as in the Euclidean arithmetic of geometric dimension $\mathbb{R}^1$, $\mathbb{R}^2$, $\mathbb{R}^3$.

Only topological torsion guarantees that $\{+1, -1\}$ anticorrelated results produces the expectation:

$$E(a,b) = -a \cdot b$$

That Bell requires of a measurement to be both local and realistic. That is Joy Christian’s result.