Why is this a plausible theory of quantum gravity?

- There must exist a formulation of quantum theory without classical time. Such a formulation is naturally a candidate for a theory of quantum gravity. The present theory proposes such a formulation.

- In giving up a classical space-time manifold, it is very natural to demand that the coordinates no longer commute with each other. This leads naturally to a non-commutative geometry.

- A quantum theory of gravity should have an exit mechanism: how to recover the classical limit? Spontaneous localisation arises naturally in this theory, because of the underlying dynamics. Moreover, it is reasonable to demand that classical space-time should appear hand in hand with macroscopic objects. That happens in this theory. The absence of macroscopic superpositions, which is inbuilt in this theory, provides a natural solution for the quantum measurement problem - it does not have to be proposed in an ad hoc manner.

- A quantum theory of gravity should naturally be able to incorporate matter. Moreover, since matter as well as space-time are both delocalised in quantum gravity, it is not meaningful to treat them as distinct. Hence it is natural to introduce the concept of an atom of space-time-matter, as is done here.

- There is no mass scale either in the Schrodinger squation or in general relativity. Both claim to hold for all mass scales but we know that is not true. Our theory naturally has a scale built into the dynamics, so that quantum theory and GR appear as small mass and large mass limits.

- Why are black holes thermodynamic objects? There is no conceptual answer to this question in general relativity. In our theory, the answer is evident, because black holes arise from the statistical thermodynamics of a large number of STM atoms.

- Why should the metric be asymmetric? Because when the co-ordinates do not commute, the anti-symmetric part of the metric will contribute to the line element. Moreover, this anti-symmetric part is anti-self adjoint, and hence provides the desired non-unitary corrections to the dynamics, leading to spontaneous localisation for macroscopic systems.

- Despite being non-unitary, the evolution is norm-preserving, because it is geodesic. This gives a natural explanation for the Born probability rule.

- Although there is no space-time in quantum gravity, the inner automorphisms of the algebra of non-commuting co-ordinates provides a natural measure of evolution. This is a feature available only to a non-commutative geometry, and absent when the coordinates commute.

- When we quantise a classical theory, then instead of imposing the ad-hoc quantum commutation relations, it is more reasonable to make all the commutators arbitrary. Then, since quantum theory has an inbuilt feature of randomness and probabilities, it is plausible that quantum theory emerges as a thermodynamic approximation in the present theory.

- There is theoretical evidence that in a quantum theory of gravity, there is a dimensional reduction at microscopic scales, as if space-time is two dimensional. This is natural in our theory, because the spectral action for an STM atom is 2-d.