

Sources and Signals

Acoherence in Practice

- Pair creation
 - Hawking radiation: pair creation, 2-mode squeezing with 1 of each pair “swallowed up”; \sim “thermal”
 - Expansion of the universe, especially inflation: pair creation, 2-mode mixing, \sim “thermal” for de Sitter
 - **“Anti-Birkhoff”**: - from spherical collapse, pair creation and 2-mode squeezing

- Inspiral
 - Early stages: Weak \approx Coherent (or *weakly acoherent*)
 - Incipient Merger: **Highly non-linear “exploratory” (multimode correlations?)**
 - **Ring-down: Quasi-normal modes - also exploratory, near-coherent??**
 - **Overtone: Squeezed out, and squeeze back (?)**

- Conjectural sources
 - axion atmospheres
 - cosmic phase transitions
 - cosmic strings

Levels of Quantum Gravity (Electromagnetic Analogs)

Quantum behavior in gravitational potentials.
(Independent particles in mean fields.)

Quantum behavior in gravitational potentials of quantum variables.
(Quantum chemistry, excluding photochemistry.)

Accessing properly gravitational degrees of freedom, as real particles.
(Photochemistry, Optics and *Quantum Optics*.)

This has been our focus. It looks to be fruitful - and ripe!

Accessing properly gravitational degrees of freedom, as virtual particles.
(Radiative corrections.)

Another level? “Space-Time Foam”? “Space-Time-Matter”?
(Another level? Unification? - Subsume into “Space-Time-Matter”?)