Abstract Submitted
for the APR07 Meeting of
The American Physical Society

Schrodinger Cats and It from Bit ALEXANDER A. BEREZIN, McMaster University — Popular interpretations and illustrations of QM observer effect (Schrodinger Cats, Wigner friend), such as (A) MWIQM (Everett), and (B) gravitationally induced psi-reduction (Karolyhazy, Penrose) may turn out to be complimentary rather than contradictory to each other. We suggest existence of phase diagram separating areas of predominantly A or B where transitions between A and B, like melting lines on traditional material phase diagrams, indicate exponential enhancement of zero-point fluctuations near critical line at which density of states experiences singularity. Since at this point the effective masses of quasi particles composing system change sign (similar to electron hole transition in condensed matter), de- Broglie wavelength diverges. This indicates on-set of strong overall quantum nonlocality. Thus, coherency in system becomes frozen and may lead to non-exponential decay of many-body excitations. Strong coherency and nonlocality translates into enhancement of spontaneous pattern formation, informational connectivity akin to holographic memory (Benveniste) effect (Berezin, in Ultra High Dilution, Kluwer, 1994) and what J.A. Wheeler calls It from Bit paradigm. Critical aspect of latter may be individualization of elementary excitations (akin to labelability of elementary particles in Bohm theories of hidden variables) which can have implications to fundamental ascending processes including bioevolution and human creativity, origins of which may lie at Planck scale.

Alexander A. Berezin
McMaster University

Date submitted: 06 Dec 2006 Electronic form version 1.4