Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Topological supersymmetry breaking: the origin of 1/f noise
IGOR OVCHINNIKOV, KANG WANG, Univ of California - Los Angeles — The scientific community across disciplines is still puzzled by the mysterious phenomenon generically known as 1/f noise – the long-range (temporal and spatial) correlations that always accompany dynamical behaviors that can be intuitively characterized as chaotic/complex. Here we discuss that within the recently proposed approximation-free cohomological (or Witten-type) Topological Field Theory of Dynamical Systems all (stochastic and deterministic) dynamical systems possess the so-called topological supersymmetry. In its turn, chaotic/complex dynamics is the result of the spontaneous breakdown of this supersymmetry and the emergence of the long-range correlations in the form of 1/f noise, butterfly effect (sensitivity to initial conditions), the power-law statistics for sandpile, neurodynamical and other avalanches, Kolmogorov power spectrum for turbulence etc. is an inevitable consequence of the Goldstone theorem.

Igor Ovchinnikov
Univ of California - Los Angeles

Date submitted: 13 Nov 2013 Electronic form version 1.4