

Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

NON-Shock-Plasticity/Fracture Burst Acoustic-Emission(BAE)
“1”/f -“Noise” Power-Spectrum(PS) Power-Law UNIVERSALITY is
Merely F=ma Time-Series Integral-Transform, aka “Bak” -“SOC” REdis-
covery” PRE(1687)-”Bak”(1988) EDWARD SIEGEL, failure-PREVENTION-
associates(fPa)/THERMALLOY-TECHNOLOGY(TAT/TATL) — NON-shock
plasticity/fracture BAE[E.S.:MSE 8,310(71);PSS:(a)5,601/607(71);Xl.-Latt.Defects
5,277(74); Scripta Met.:6,785(72);8,587/617(74);3rd Tokyo AE Symp.(76);Acta
Met. 5,383(77);JMMM 7,312(78)] “1”/ω-“noise” power-spectrum “pink”-Zipf(NOT
“red”=Pareto) power-law UNIVERSALITY is manifestly-demonstrated in two dis-
distinct ways to be nothing but Newton 3rd Law of Motion F = ma REdiscovery!!!
(aka “Bak”(1988)-“SOC”:1687 <<<1988: 1988-1687=301-years!!! PHYSICS:F=ma
cross-multiplied as 1/m=a/F=OUTPUT/INPUT= EFFECT/CAUSE=inverse-
mass mechanical-susceptibility= $\chi(“\omega”)$; $\chi(“\omega”) \sim (F.-D.thm.) \sim P(“\omega”) “noise”$
**power-spectrum; (“Max & Al show”): $E \sim \omega$; & $E \sim (\text{upper-limiting-speeds}$
media) $\sim m$. Thus: $\omega \sim E \sim m$; Inverting: $1/\omega \sim 1/E \sim 1/m \sim a/F = \chi(“\omega”) \sim P(“\omega”)$;
Thus: F=ma integral-transform(I-T) is ’’SOC’’s” $P(\omega) \sim 1/\omega!!!$; ”PURE”-
MATHS: F=ma DOUBLE-integral time-series(T-S) $s(t)=[v_0 t + (1/2)at^2]$ I-T for-
mally de?nes power-spectrum(PS): $P(\omega) \equiv \int s(t)e^{-i\omega t}dt = \int [v_0 t + (1/2)at^2]e^{-i\omega t}dt =$
 $v_0 \int a(t)e^{-i\omega t}dt + (1/2)[a \neq a(t)] \int t^2 e^{-i\omega t}dt = v_0 (\partial/\partial\omega)\delta(\omega) + (1/2)[a \neq a(t)](\partial^2/\partial\omega^2)\delta(\omega) = v_0/\omega^0 +$
 $(1/2)[a \neq a(t)]/\omega^{1.000...}$; uniform-velocity $a=0$ PS $P(\omega) = 1/\omega^0$ WHITE vs. uniform:-
 $a>0; a<0$ PS $P(\omega) = 1/\omega^{1.000...}$ pink/flicker/HYPERBOLICITY.**

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