# **Energy-Density or Force-Unification Eras of the Cosmos**

including "wormhole" weak force IVB connections between eras

(John A. Gowan Feb., 2015)



Eternal, Conserved, Symmetric
All possible (conserved) electromagnetic universes — various physical constants
(? other energy types?)



"Big Bang "wormhole": a single EM universe (of zero net energy and charge) randomly manifests (via quantum fluctuation?)

## LEPTOQUARK ERA

**TOE:** Theory of Everything — all forces unified (Higgs 3) Symmetric particle-antiparticle pairs — primordial leptoquarks "Big Bang": our universe with its unique physical constants

"Y" IVBs (Intermediate Vector Bosons of the weak force) convert electrically charged leptoquarks to electrically neutral leptoquarks (heavy analogs of neutrons)

"Y"

"Y" IVB "wormhole": electrically neutral leptoquarks selected by "Y" IVBs

## **HYPERON ERA**

**GUT:** Grand Unified Theory — strong and electroweak forces unified (Higgs 2) Heavy baryons — particles containing three quarks — mass carriers Symmetry-Breaking via the weak force "X" IVBs

Electrically neutral leptoquarks decay asymmetrically via "X" IVB to produce our matter-only universe, including mass-carrying baryons and leptoquark anti-neutrinos

"X"

"X" IVB "wormhole": colorless baryons selected by "X" IVB — "proton decay"

### LEPTON ERA

**EW:** Electroweak force unification — electric and weak forces unified (Higgs 1) Alternative Charge Carriers: (leptons, neutrinos, and mesons) "W" IVB leptonic particle and quark transformations

]"W"[

"W" IVB "wormhole": alternative charge carriers selected by "W" IVB — leptonic decays and nuclear transformations; (lepton number = zero)

### ATOMIC ERA

EM: Electromagnetic unification — all forces distinct (photon velocity "c")

Periodic Table, chemistry, atoms, molecules, Life,
free photons, spacetime, macro-universe, history, causality
Ground State — stable, cold, asymmetric (no antimatter, no IVBs)
Electron-shell chemistry only — no nuclear reactions

All forces act spontaneously to return asymmetric atomic system to its original light symmetry.