# GIBM v0.1
# A Framework for Recovering Physical Maps from Realized Relation

*Working Draft for Review and Formal Development*

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## Author responsibility note

This draft presents GIBM as a framework scaffold, not as a completed mathematical theory. It identifies primitives, recovered maps, bridge claims, and open derivation burdens. Claims are intentionally status-labeled to prevent speculative overreach.

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## Abstract

GIBM, the Geometry / Information / Bit Manifold framework, is proposed as a first scaffold for recovering physical maps from a deeper process of realized relation. The framework treats space, time, matter, fields, particles, forces, probability, mass, and geometry as non-primitive recovered descriptions rather than basement entities. Its minimum hard core consists of distinction, local relation, admissibility, ordered update, and persistence criterion. Information is treated as admissible distinguishable local state-content, and a cell is treated as a minimal local admissibility/update domain rather than as a spatial box or particle.

The paper defines the GIBM process chain: possibility offers, constraint filters, compatibility fits, realization expresses, coherence holds, continuity preserves identity, and residualized possibility accounts for viable nonexpression without promoting every alternative into a full world or deleting it into nothing. Entropy is interpreted as scope-relative recoverability loss with accounting preserved. Quantum-like support is framed as oriented unresolved support, with squared-norm measure motivated by the joint requirements of interference and additive exclusive record accounting. Energy, momentum, and mass are treated as recovered action-gradient structures, with mass defined as invariant rest-action content. Gravity is treated as recovered path-structure distortion in a relation-access map, with free fall understood as stationary rest-action through that map.

This draft also places dark matter, black holes, and Standard Model categories without claiming complete derivation. Dark matter is categorized as realized path-shaping structure without ordinary electromagnetic resolution. Horizons are treated as recoverability boundaries rather than proof of absolute destruction. Electromagnetism, strong interaction, and weak interaction are placed as resolved coupling, coherence-locking, and continuity-permitted reconfiguration regimes respectively. The strongest open burdens remain individual actualization selection, full gravity field-equation recovery, Standard Model/gauge recovery, black-hole entropy and Hawking recovery, mass-generation mechanisms, and the derivation of physical constants.

## Claim Status Legend

| Status label | Meaning | Public claim discipline |
|---|---|---|
| Locked definition | A stable GIBM term or category definition. | Can be used directly, but still subject to future refinement. |
| Strong bridge | A coherent bridge from GIBM primitives/maps to known physics or a required category. | Can be presented as a serious recovery route, not as final proof. |
| Near-real-pass under assumptions | A result that follows tightly if specified assumptions are accepted. | State the assumptions explicitly. |
| Open recovery target | A necessary derivation or recovery not yet completed. | Must not be presented as solved. |
| Speculative reserve | A live intuition or possible future connection not ready for public claim. | Mention only if clearly labeled, or keep private. |

## 1. Purpose and Scope

The purpose of GIBM v0.1 is not to replace existing physics at the calculation level. General relativity, quantum mechanics, quantum field theory, and the Standard Model remain high-performing empirical maps over their valid domains. GIBM instead asks whether the categories used by those maps can be recovered from a smaller relation/update basement without treating those categories as primitive.

The guiding rule is: show the primitive, show the map, show the bridge, show the test. A successful GIBM recovery must preserve measured behavior or predict disciplined deviations. A failed recovery should fail explicitly rather than survive by rhetorical flexibility.

The present document is therefore a framework paper. It is not a final theory of quantum gravity, a completed Standard Model derivation, a dark energy solution, or a black hole information solution. It is a lock-ready scaffold intended to identify what has been stabilized, what has been bridged, and what remains open.

## 2. Basement Primitives

The minimum complete architecture of GIBM v0.1 consists of five basement primitives:

1. Distinction: the minimum basis by which alternatives are not identical.
2. Local relation: direct coupling in the dependency/update structure, not mapped geometric nearness.
3. Admissibility: structurally possible local successor existence under the current update regime.
4. Ordered update: dependency-ordered transition from current local state toward successor state.
5. Persistence criterion: the minimum retention condition by which a structure can remain expressible across update or map recovery.

Space, time, particles, fields, forces, waves, geometry, spacetime, mass, gravity, electromagnetism, and probability are not basement primitives in this version. They must be recovered later as valid maps, regimes, or bridge structures.

### 2.1 Information and Cell

Information is redefined as admissible distinguishable local state-content. It is not semantic meaning, human knowledge, digital bits, or an independent substance. It is the structured capacity for local distinction and admissible form.

A cell is redefined as a minimal local admissibility/update domain. It is not a particle, atom, spatial box, simulation pixel, or object. It is the minimum local domain in which admissibility, update, and persistence can be evaluated.

### 2.2 Irreducible Update Law

For a local domain c, let q_c(t) denote the current state, N_c(t) its directly related neighborhood, A_c(t) its admissibility structure, and P_c(t) its persistence weighting. The irreducible update form is written schematically as:

q_c(t+1) = U_c(q_c(t), N_c(t), A_c(t), P_c(t))

This expression is not yet a final law. Its purpose is to keep the basement free of imported spacetime, force fields, particles, or metric geometry.

### 2.3 Admissibility and Dominance

A candidate local successor state q is admissible only if it passes four structural tests: internal consistency, neighborhood compatibility possibility, update-continuity possibility, and nonzero persistence possibility:

A_c(q,t) = I_c(q) N_c(q,t) U_c(q,t) P_c(q,t)

q is admissible iff A_c(q,t) = 1.

Admissibility is not dominance, long-term stability, or selection. It only means structurally possible successor existence under the current update regime.

For an admissible candidate q, dominance is structured expression pressure:

Sigma_c(q,t) = alpha L_c + beta C_c + gamma S_c + delta R_c + epsilon K_c

where L_c is local fit pressure, C_c is continuity pressure, S_c is rival suppression pressure, R_c is resolving-interaction pressure, and K_c is closure pressure. A candidate becomes expressed only if its dominance gap exceeds Delta_D and closure pressure exceeds its threshold. Otherwise the domain remains in tension.

## 3. The Process Chain

The core GIBM process chain is:

possibility -> constraint -> compatibility -> realization -> coherence -> continuity

The v0.1 extension adds residualized possibility:

possibility -> constraint -> compatibility -> realization -> residualized possibility -> entropy/recoverability accounting

### 3.1 Possibility, Constraint, Compatibility

Possibility is the range of local forms available to a domain within its dependency conditions before realization. Constraint is the reduction of available possibilities by local dependency relations and actual neighborhood conditions. Compatibility is the degree to which a possible form fits the local dependency situation strongly enough to remain viable for realization.

Compatibility is graded rather than binary. A possible form may be admissible in principle, constrained-in under current conditions, and yet weakly compatible compared with a rival. This distinction prevents GIBM from collapsing admissibility, preference, and expression into the same concept.

### 3.2 Realization, Coherence, Continuity

Realization is the threshold or fixation event by which a locally viable form becomes an expressed outcome with physical standing. Coherence is the degree to which a realized arrangement holds its relational structure through

local dependent updates. Continuity is the degree to which a realized arrangement preserves enough relational identity through progression to remain the same developing structure.

Realization, coherence, and continuity are distinct. A flash can be realized but fail to cohere. A structure can cohere briefly while losing continuity. A person can preserve continuity through large material change. Continuity is therefore identity-relative, not mere sameness without change.

## 4. Residualized Possibility

Residualized possibility is the central v0.1 addition. It is the category needed to avoid two inadequate extremes: many-worlds-style full coexpression and collapse-style deletion into nothing.

Residualized possibility is nonexpressed viable structure considered relative to a scope of recovery, recombination, or record expression. It is not treated as a full alternate world, and it is not treated as absolute nothing unless a deeper deletion rule is later derived.

### 4.1 Scope Rule

Residuals are always scope-relative. A possibility can be residual at record scope, unrecoverable at branch-local scope, dispersed at environmental scope, and still not be declared absolutely nonexistent at deep-update scope.

| Scope | Question | Residual means |
|---|---|---|
| Branch-local | Can the branches still recombine? | No longer available for clean recombination. |
| Record | Which outcome is expressed? | Not expressed in the stable record structure. |
| Environment | Is the structure locally recoverable? | Dispersed into inaccessible correlations. |
| Deep update | Is it absolutely gone? | Open; not claimed without further derivation. |

### 4.2 Accounting Rule

Nonexpressed viable structure cannot vanish without classification. Outcome-status is not conserved, but accounting must be.

For a closure event at scope sigma:

$M_{pre} = M_{expressed} + M_{residual} + M_{env} + M_{ent} + M_{deep} + M_{unknown}$

This does not mean every term is measurable. It means GIBM must classify the loss of branch availability as expressed, residualized, dispersed, entropy-loaded, redistributed, or outside current recovery. The framework does not allow unclassified deletion.

## 5. Entropy as Recoverability Loss

Entropy is defined in GIBM as scope-relative recoverability loss with accounting preserved. It is the degree to which prior distinctions, viable possibilities, update histories, or fine relational structures remain part of the accounting but are no longer cleanly reconstructable, recombinable, or expressible within the current map or record scope.

Short form: entropy is recoverability loss. A more compressed descriptive line is: entropy is the shadow of unresolved or unrecoverable structure in the expressed map.

If $C_{rec,\sigma}$ is the recombination or recovery capacity at scope sigma, then an entropy-like quantity may be represented schematically as:

$S_\sigma \sim -\log C_{rec,\sigma}$

For thermodynamic entropy, GIBM preserves the standard structural idea S = k_B log Omega, but interprets Omega as the number or measure of recoverability-degenerate underlying configurations compatible with the current expressed macrostate.

## 6. Observation, Closure, and Actualization

Observation is outcome-resolving interaction. It is not human awareness, later reading, or consciousness-dependent magic. A detector, environment, or other physical system can function as an observer if its interaction resolves outcome and leaves or induces physical standing.

Closure occurs when unresolved admissible structure is driven into expressed outcome under sufficient dominance, recombination failure, and record stabilization. The current architecture is:

{R_i} -> R_k + {Res_sigma(R_j != k)}

Actualization is the expression of one record-compatible outcome at a scope where recombination has failed and record stability has formed. The nonexpressed viable alternatives become residualized accounting.

The individual selector remains open. GIBM v0.1 does not yet fully derive why this exact record actualizes in this exact event. It constrains the problem without pretending to solve it.

## 7. Oriented Support, Born Measure, and Hilbert Structure

Quantum-like support in GIBM is not ordinary scalar probability. Unresolved support must carry orientation or cyclic offset if interference is to be recovered. A branch support may be represented as z = r exp(i phi), or equivalently as an oriented two-component support vector.

If unresolved supports recombine, their offsets must matter:

Z = z_A + z_B

Then squared support naturally yields interference:

|Z|^2 = |z_A|^2 + |z_B|^2 + 2 Re(z_A* z_B)

Exclusive record accounting requires additive measure over mutually exclusive outcomes. If M(Z) = |Z|^p and orthogonal unit supports e_1 and e_2 are combined, additivity demands:

M(e_1 + e_2) = M(e_1) + M(e_2)

(sqrt(2))^p = 2, so p = 2

Thus M(Z) = |Z|^2 under oriented support, phase invariance, and exclusive record additivity. Frequencies then follow by proportional sampling of support measure:

P_i = |Z_i|^2 / sum_j |Z_j|^2

Status: the squared-norm measure is near-real-pass under stated assumptions. Full Hilbert-space quantum mechanics remains a strong bridge, not a completed derivation.

## 8. Energy, Momentum, and Mass

Energy and momentum are recovered action-gradient structures. With support phase phi = S / hbar:

E = -partial_t S

p = nabla S

Energy is the recovered clock-relative rate of action/support-phase accumulation. Momentum is the recovered spatial or relation-access phase-gradient of support/action structure.

Energy and momentum are two projections of the same action-gradient. Mass is not amount of stuff. It is the invariant rest component of a persistent patch's action-energy-momentum structure:

m = (1/c^2) sqrt(E^2 - p^2 c^2)

At rest, p = 0, so:

m = E_rest / c^2

Rest does not mean absence of internal update. Rest means no net translational support-phase gradient. A patch at rest may still contain internal update/action activity.

Inertia is the cost of redirecting persistent rest-action structure. In the low-velocity limit:

E ~ mc^2 + p^2/(2m)

T ~ p^2/(2m) = (1/2) m v^2

## 9. Gravity as Relation-Access Path Distortion

Gravity is not a primitive force. It is recovered as path-structure distortion in a relation-access map. Persistent support/action-energy structure modifies admissible path structure, appearing in coarse-grained maps as relation-access distortion, curvature, time dilation, and free-fall geometry.

Mass is the weak localized rest-matter source limit. Full gravity must couple to a stress-energy-like support/action distribution, written schematically as T_mu_nu^GIBM.

The source-response bridge is:

T_mu_nu^GIBM -> Delta A_paths -> g_mu_nu^rec

where A_paths denotes admissible path structure and g_mu_nu^rec denotes the recovered metric-like relation-access map.

### 9.1 Free Fall and Geodesic Recovery

For a massive free patch, the free action is:

S_free = -mc^2 integral d tau

Because mc^2 = E_rest, this states that free rest-action accumulates along the patch's own proper clock-chain. Stationary action gives:

delta S = 0 -> delta integral d tau = 0

Thus free massive patches follow geodesics in the recovered relation-access map. The mass factor affects phase rate, but cancels from the stationary path condition. Universal free fall follows in the test-body regime.

### 9.2 Weak Newtonian Limit

In the weak, slow, static limit, the recovered metric can be represented by a scalar potential Phi:

g_00 ~ -(1 + 2 Phi/c^2)

The geodesic equation reduces to:

a = -nabla Phi

For a spherical weak source:

Phi(r) = -GM/r

|a| = GM/r^2

Status: the architecture is locked, but the exact source law, coupling constant G, and full field equation remain open recovery targets.

## 10. Dark Matter, Dark Energy Target, and Non-Ordinary Recoverability

Dark matter is not identified with residualized possibility. In GIBM v0.1, dark matter is realized path-shaping structure without ordinary electromagnetic resolution. It is real to gravity/path maps but not recovered by ordinary EM visibility.

Residualized possibility is different: it is nonexpressed viable structure after realization, preserved as accounting rather than as a full world or absolute nothing.

Entropy is different again: it is a scope-relative measure of recoverability loss, not an object or substance.

Dark energy is not claimed. It remains a later cosmological recovery target for possible large-scale relation-access structure, residual-accounting pressure, hidden-dimension-like gravity correction, vacuum/recoverability structure, or emergent expansion dynamics.

| Category | GIBM placement | Status |
|---|---|---|
| Ordinary matter | Realized, coherent, persistent, EM-resolved structure. | Locked category. |
| Dark matter | Realized path-shaping structure without ordinary EM resolution. | Taxonomy locked; identity open. |
| Residualized possibility | Nonexpressed viable structure after realization. | Category locked; physical effects open. |
| Entropy | Scope-relative recoverability loss. | Conceptually locked; functional open. |
| Dark energy | Later cosmological recovery target. | Not claimed. |

## 11. Black Holes, Horizons, and Information

Black holes are treated as recoverability crisis zones, not automatic deletion zones. A horizon is a map-accessibility boundary where outward recoverability fails for a given external map.

External recoverability failure is not proof of basement deletion. Continuity can persist beyond recoverability. Information loss is therefore first treated as external recovery failure, not proven destruction.

Black hole entropy is placed as horizon-scope recoverability loss: the measure of structure no longer recoverable to the external map across the boundary. GIBM does not yet derive the area law S_BH = k_B A/(4 l_P^2), Hawking radiation, exact metrics, or an information-paradox solution.

A singularity is treated as map-faithfulness failure under extreme conditions, not as confirmed basement infinity. A possible later term is closure-saturated core, but this is not yet a model.

## 12. Standard Model Category Placement

The Standard Model is treated as a successful empirical particle/interaction map, not as the basement of reality. GIBM must eventually recover its measured behavior, but does not treat its particles, fields, gauge groups, or couplings as primitive.

| Standard category | GIBM placement | Status |
|---|---|---|
| Electromagnetism | Resolved coupling relation and propagation. | Conceptually locked; gauge derivation open. |
| Strong interaction | Extreme local coherence-locking under narrow compatibility conditions. | Category locked; QCD recovery open. |
| Weak interaction | Continuity-permitted local reconfiguration. | Category locked; electroweak recovery open. |
| Quarks | Narrow-lock localized structures. | Placed; not derived. |
| Electrons | Stable localized EM-coupling structures. | Placed; not derived. |
| Photons | Massless propagated resolved coupling changes. | Strong conceptual placement. |
| Neutrinos | Barely coupled weak-reconfiguration structures. | Placed; not derived. |
| Antimatter | Opposite coupling orientation with matching rest-action magnitude. | Placeholder locked; details open. |
| Higgs/mass generation | Open recovery target for rest-action terms and symmetry-breaking map behavior. | Not derived. |

## 13. Open Burdens and Failure Conditions

### 13.1 Strongest Open Burdens

- Individual actualization selector: why this exact record actualizes in this exact event.
- Full gravity source-response equation: recover an Einstein-like or alternative field equation from support/action-energy loading of relation-access structure.
- Coupling constants and physical constants: recover or constrain hbar, c, G, and interaction constants rather than importing them.
- Standard Model and gauge recovery: recover U(1), SU(2), SU(3), spin, statistics, charge, generations, Higgs mechanism, and known particle data.
- Black hole derivations: recover horizon scale, area-law entropy, Hawking radiation, Kerr behavior, and information accounting.
- Mass-generation mechanisms: recover how real particle and composite masses arise from rest-action content, binding, field energy, and symmetry-breaking regimes.
- Entropy functional: define exact scope-relative entropy measures and connect them to thermodynamic constants.
- Empirical predictions: identify where GIBM makes disciplined deviations or new tests rather than only reinterpretations.

### 13.2 Framework Failure Conditions

- Failure if recovered objects such as space, time, particles, fields, gravity, mass, or probability are smuggled back into the basement.
- Failure if selection/closure remains unexplained and only renamed.
- Failure if map and basement collapse into one another.
- Failure if no believable recovery path exists for observed results.
- Failure if bridges become ad hoc patches that do no predictive or constraining work.
- Failure if the framework cannot specify where its own maps become invalid.

## 14. Public Release Guidance

A first public version should not be framed as a completed theory of everything. It should be framed as a first formal scaffold for recovering physical maps from realized relation. The safe public claim is that GIBM has a defined basement, a process chain, a map-recovery discipline, strong bridge routes in several domains, and explicit open burdens.

Claims suitable for a first public paper:

- The primitive/derived split is explicit.
- Information, cell, locality, realization, coherence, and continuity are defined in a non-spacetime basement.
- Residualized possibility provides a third category between many-worlds and deletion-to-nothing.
- Entropy is reframed as recoverability loss with accounting preserved.
- Born measure is strongly motivated by oriented support plus exclusive record additivity.
- Energy, momentum, and mass are recovered action-gradient structures.
- Gravity is placed as relation-access/path distortion, with free fall as stationary rest-action.
- Dark matter, black holes, and Standard Model categories have disciplined placements, not full derivations.

Claims not suitable yet as solved public claims: dark energy explanation, complete quantum gravity, Standard Model derivation, black hole information solution, full Born theorem without assumptions, actualization selector, or derived constants.

## 15. Conclusion

GIBM v0.1 is not a finished mathematical theory. It is a lock-ready conceptual and formal scaffold. Its central claim is that physical reality should not be built from finished things first, but from distinguishable possibility structured into realized relation. The framework separates basement primitives from recovered maps, gives major physical categories a disciplined place, and names the open burdens that must be solved if the framework is to survive.

The current working verdict is: everything gets a place; nothing gets a free pass. GIBM is coherent enough to write, test, and extend, but not complete enough to overclaim.

## Appendix A. Notation Summary

| Symbol / term | Working meaning |
|---|---|
| c | Local domain / cell; not a speed unless explicitly stated as recovered c. |
| q_c(t) | State of local domain c at update or recovered time parameter t. |
| N_c(t) | Directly related neighborhood of local domain c. |
| A_c(t) | Admissibility structure for local domain c. |
| P_c(t) | Persistence weighting or criterion. |
| U_c | Local update rule. |
| A_c(q,t) | Admissibility product for candidate successor q. |
| I_c, N_c, U_c, P_c | Internal consistency, neighborhood compatibility possibility, update-continuity possibility, nonzero persistence possibility. |
| Sigma_c(q,t) | Dominance / expression pressure functional. |
| L_c, C_c, S_c, R_c, K_c | Local fit, continuity pressure, rival suppression, resolving-interaction pressure, closure pressure. |
| Delta_D | Minimum dominance gap for expression. |
| Theta_K | Closure pressure threshold. |
| Res_sigma(X) | Residualized status of X relative to scope sigma. |
| C_rec,sigma | Recoverability or recombination capacity at scope sigma. |
| S_sigma | Scope-relative entropy / recoverability-loss measure. |

| | |
|---|---|
| phi | Support phase. |
| S | Action. Context disambiguates from entropy S_sigma. |
| E | Recovered clock-side action rate. |
| p | Recovered spatial/relation-access action-gradient. |
| m | Invariant rest-action content divided by c^2. |
| T_mu_nu^GIBM | Recovered stress-energy-like support/action distribution. |
| g_mu_nu^rec | Recovered metric-like relation-access map. |

## Appendix B. Claim Status Table

| **Area** | **Current v0.1 status** |
|---|---|
| Basement primitives | Locked enough. |
| Information / cell / locality | Locked enough with wording discipline. |
| Realization chain | Mostly locked. |
| Actualization selector | Open. |
| Residualized possibility | Locked enough. |
| Entropy | Conceptually locked; exact functional open. |
| Born/Hilbert | Strong bridge; squared measure near-real-pass under assumptions. |
| Energy/mass | Recovered definitions locked; deep derivations open. |
| Gravity | Architecture locked; full field derivation open. |
| Dark matter taxonomy | Locked enough. |
| Dark energy | Future recovery target only. |
| Black holes | Conceptual lock; quantitative recovery open. |
| Standard Model | Category placement locked; formal recovery open. |
| Public writeup readiness | Possible if carefully tiered. |