Completion, Not Unification: Einstein's Field Program as a Template for Individual Description

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Companion to Shields, Individual Completion of Metastable Decay (2026) — September 2026

A note on two uses of the word unified. The first paper supplies the predictive primitive; this one locates that primitive in Einstein's actual field program.

Abstract

Postwar physics uses *unification* for a family of projects that keep the quantum formalism as the form of the fundamental laws and join gravity, or the remaining forces, to that formalism. Einstein used the same word for a different project: a complete individual description in spacetime, one field rather than two, particles and instruments not foreign to the field, and statistical quantum theory demoted to the role statistical mechanics plays inside classical mechanics. This companion paper separates those projects. The target argued in the preceding paper is completion of the individual situation, not a marriage of general relativity to the existing quantum algorithm. Einstein's unified field theory is nonetheless not optional furniture. It is the *type* of completion he would accept. One may retire his particular continuum if a better primitive appears; one may not replace his demand with quantization-as-unification and still claim his program. Contact with already catalogued quantum statistics is a graduation constraint on any such completion, not an entrance examination written in Bell's variables.

Keywords: Einstein unified field theory; incompleteness; completion; quantum gravity; Reply to Criticisms; individual description

1. The same word, two jobs

A companion paper set a predictive primitive for metastable decay: an exact first-event time T*(S) fixed by a complete individual state, with laboratory statistics recovered only when part of that state is unread (Shields, 2026). That primitive was written against a misreading of Einstein's 1949 *Reply to Criticisms* as a hidden-variable model of the present quantum formalism. A second misreading sits next to the first and is almost as common. It treats Einstein's late unified field theory as an ancestor of the postwar attempt to unify general relativity with quantum mechanics.

The ancestor relation is verbal, not architectural. Contemporary seekers for a grand unified theory or a quantum gravity have sometimes claimed Einstein's quest as prophecy of their own (see the reception described in van Dongen, 2010). The prophecy works only if *unification* is allowed to change its object while keeping its name. This paper does not allow that. The object of the 1949 program is a complete description of the individual real situation, irrespective of observation (Einstein, 1949). The object of most postwar unification is a single quantum framework for more interactions. Those are not two stages of one project. They are two projects.

2. What Einstein was unifying

From the 1920s until his death Einstein hunted a field theory in which gravitation and electromagnetism were not two tenants of spacetime, and in which matter was not inserted by hand as a stranger to the geometry (Goenner, 2004; van Dongen, 2010). Particles were to appear as features of the field—regular

solutions if he could get them, not singularities tolerated as a permanent ontology (Einstein, 1949, 1953). Measuring rods and clocks were not to stand outside the field as a second physics. The laws of the finished theory were to relate the conceptual elements of a complete individual description and, per se, to have nothing to do with statistics (Einstein, 1949).

Lehmkuhl (2010) usefully splits three aims that the literature often fuses: a unified field theory in the narrow sense (one field, not a sum of independent invariants); a *complete* field theory (particles derivative of fields, not sources beside them); and a geometrised theory. Einstein wanted the first two together, and he wanted the quantum facts to come back as the statistical mechanics of that complete field, not as the form of its laws. Van Dongen notes the same displacement of aim: as the work with Bargmann and Bergmann unfolded, the real goal was less to incorporate electromagnetism than to supplant quantum mechanics by deriving its statistics from a classical field theory (van Dongen, 2010).

That is unification as *completion*. The unity is ontological and nomological: one furniture, one law, chance not primitive. It is not the unity of a Lagrangian that already lives in Hilbert space.

3. What postwar unification is doing

After Einstein the dominant sense of the word flipped. One keeps the quantum law—amplitudes, operators, path integrals—and asks how gravity, or the remaining forces, can be written inside that law. Success is a finite, or at least effective, quantum theory whose low-energy limits include the Standard Model and general relativity. The individual mark on the paper is not the object under repair. The object under repair is the joint consistency of two successful formalisms.

There is nothing illegitimate about that project. It is simply not Einstein's. A theory can be unified in the postwar sense and still treat the ψ-function as a complete description of the individual, or still leave the decay instant of this atom outside the description. Conversely, a theory can be complete in Einstein's sense without yet having joined every interaction into a single geometric object. Completion and unification-as-quantization therefore cross. Treating the second as the continuation of the first hides the first.

4. Why the first paper was a completion paper

The primitive T*(S_coarse ⊕ S_perp) does not unify gravity with the other forces. It does not quantize the metric. It answers a narrower and prior question posed in the *Reply*: does the individual metastable system have a decay instant that a complete description would contain? The analog constructed there shows only the logical relation Einstein named. Specified remainder, specified instant; unread remainder, waiting-time law; partial readout, shrinking variance (Shields, 2026). That relation can be instantiated in a field theory of Einstein's type. It can also, in principle, be instantiated in some other complete individual structure. What it cannot be is replaced by a more comprehensive quantum algorithm without changing the subject.

Hence the division of labor. The first paper writes the scoreboard for completion in the case Einstein used as his example. This paper writes the institutional warning: do not cash that scoreboard in as a contribution to quantum gravity, and do not cash quantum gravity in as a discharge of the 1949 demand.

5. Why his unified field theory is still the template

If the target is completion, why keep the phrase *unified field theory* at all? Because Einstein did not leave the type of completion unspecified. He left a list of what a finished individual physics was allowed to look like.

The complete state is a field configuration on a spacetime continuum, not an amplitude over configurations plus an extra parameter. Particles are not a second species. The apparatus is the same species as the system. Singularities are a defect to be removed if the theory is to have laws rather than exceptions (Einstein, 1949). Statistics enter when the complete configuration is replaced by a coarse cell—the laboratory preparation—not as a term in the field equation.

That list is the template. A later completion that keeps the list and changes the particular geometry (asymmetric metric, extra dimension, some pregeometric replacement) is still his program. A later theory that drops the list and quantizes the leftover field is a different program that has borrowed a banner.

He himself left one door open. In the later pages of the *Reply* he faces the possibility that quantum facts make the continuum itself suspect, and he keeps the continuum only because he has no organic replacement. The template therefore has a proviso: the four-dimensional field is the best complete primitive he could name, not a revealed ontology. What the proviso does not license is the inference that, the continuum being doubtful, one should take the present statistical scheme as fundamental and call the result unification.

6. Entrance and graduation

A completion of Einstein's type is still a theory of the world we already measure. If the unread ensemble of complete states is to stand to statistical quantum theory as molecular mechanics stands to thermodynamics, the shadow cast by that ensemble must eventually include the regularities we already have. Distant correlations belong on that list. They do not belong on the entrance examination (Shields, 2026). They belong at graduation.

The reason for the delay is not evasive. Einstein's own choice in the *Reply* was incompleteness plus independent real states for spatially separated systems. Whether a local field completion can cast the full quantum shadow is an open question about a successor, not a theorem about a λ-model of ψ. Pauli already pressed a version of the doubt: even if singularity-free classical solutions exist, they may not recover atomic facts without the statistical interpretation in principle (Pauli to Einstein, cited in Sauer / Goenner accounts of the late correspondence). That is a fair pressure. It is pressure on a completion to earn its statistical mechanics. It is not a proof that the only remaining unity is a quantized metric.

7. Conclusion

Look for completion, not for unification in the postwar sense. Keep Einstein's unified field theory as the name of the *kind* of completion he thought could work: one spacetime field, particles and instruments included, chance not in the law. Retire particular geometries if they fail. Do not retire the demand because a different project, which kept the quantum law and enlarged its inventory, inherited the word *unified*.

The preceding paper gave that demand a number, T*, in the example Einstein chose. This paper gives it a jurisdiction. The jurisdiction is individual physics. Quantum gravity, whatever else it is, does not automatically occupy it.

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