

Three Laws by One Man Have Nothing in Common but the Man

— what upholds the three is charge conservation, detailed balance and the superposition of waves, and none follows from another — [Paper 510]

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— *From thinking to syncing.* —

Abstract

Three laws bearing one man's name are readily taken for three faces of one principle. This paper shows that the balance upholding each is a different one—and each breaks in a different way. No new theorem or law is claimed. First, in circuits $i_1 + i_2 = 2.307692308$ A is conserved at the node while both loops close at 12.000000000 V and 6.000000000 V (Section 2). Second, in radiation, equal absorptivity and emissivity leave a net of 0.000000000000 W/m² (Section 3). Third, unequal values leave ± 183.720131 W/m², breaking equilibrium (Section 3). Fourth, in diffraction the first null is 1.404×10^{-33} and the secondary maximum 0.045032—matching the closed form $(\sin u/u)^2$ (Section 4). Fifth, this is the core of the paper. The three rest on charge conservation, detailed balance and the superposition of waves, and none follows from another (Section 5). Sixth, the separator is whether a shared name points to one person or to one mechanism (Section 5). **Keywords:** Kirchhoff's laws, electric circuits, thermal radiation, diffraction, eponymous laws.

Scope of this paper (scope note): No new theorem or law is claimed—the circuit laws, the radiation law and the diffraction integral are all standard. History is not the subject—that one person produced all three is used as a fact, but the course of publication and questions of priority are not entered. Diffraction is not treated exactly—only a one-dimensional Fraunhofer calculation is done; the known inconsistency of the boundary conditions in Kirchhoff's diffraction theory is not entered. Wavelength dependence is excluded—absorptivity and emissivity are taken as wavelength-independent constants, though the relation holds wavelength by wavelength. No claim that three is the whole count—other work by the same person is not counted. Relation to earlier papers: Paper 125 showed that there are three Hopfs—there one name pointed to three different people; here one person holds three different laws. The direction is reversed. Paper 214 showed that a lens cannot increase brightness—the radiation law is what underlies it. Paper 300 showed that a shared root can be decided—the three are distinct roots, and the balances upholding them are the evidence. Paper 481 showed that without separators a refutation has no destination—this paper writes one of them. What is added is putting numbers to all three in one paper, confirming that one circuit solution closes both loops, giving the radiative net as $\pm 183.720131 \text{ W/m}^2$, matching the diffraction maximum to its closed form, and placing the separator at what a name points to.

1. Notation and the Question

Setting: Check numerically three laws bearing one person's name. The circuit laws say that current is conserved at a node and that voltage closes round a loop. The radiation law says that at thermal equilibrium absorptivity equals emissivity. The diffraction formula says that contributions from every point of an aperture are summed. Each is computed independently below.

Observation 1.1

Three laws bearing one man's name are readily taken for three faces of one principle. One idea unfolding—consistent within one mind, runs the picture.

Observation 1.2

But the fields differ. Electric circuits, thermal radiation, the diffraction of light—nothing guarantees that the physics upholding them is the same.

Question: What upholds each, and is it the same thing.

2. Circuits: Current Is Conserved at a Node

Computation 2.1: Solve a two-loop circuit with sources of 12 V and 6 V and resistances of 4, 3 and 2 Ω .

Quantity	Value
i_1	1.846153846 A
i_2	0.461538462 A
$i_3 = i_1 + i_2$	2.307692308 A

Observation 2.2

It is conserved at the node.2.307692307692 against 2.307692307692—agreeing to twelve digits.

Observation 2.3

Both loops close at once.12.000000000 against 12 and 6.000000000 against 6—one solution satisfying two conditions.

Observation 2.4

Changing a source changes the currents.Raising 12 V to 24 V moves i_1 from 1.846154 to 4.153846—the test responds to the input: this is not an identity.

Observation 2.5

What upholds it is the conservation of charge.No charge accumulating at a node—the loop half comes from the potential being a function of position.

3. Radiation: Absorptivity Equals Emissivity

Computation 3.1: With body and surroundings both at 300 K, evaluate the net flux.

Absorptivity	Emissivity	Net (W/m ²)
0.9	0.9	0.000000
0.9	0.5	+183.720131
0.5	0.9	−183.720131

Observation 3.2

Equal values leave nothing. 0.000000000000 W/m²—not merely within rounding; an exact cancellation.

Observation 3.3

Unequal values leave a net. ±183.720131 W/m²—heat flowing between bodies at the same temperature, colliding with the second law.

Observation 3.4

The direction follows the inequality. Positive when absorptivity is larger, negative when smaller—symmetric in sign: it breaks equally either way.

Observation 3.5

At different temperatures a net survives even when they are equal. 893.084 W/m² between 300 K and 400 K—but this does not collide with the second law. Whether the law is broken can only be asked at equal temperature.

Observation 3.6

What upholds it is detailed balance. Each process balancing its reverse at equilibrium—unrelated to the conservation of charge.

4. Diffraction: Summing the Contributions of an Aperture

Computation 4.1: For a 5 μm slit at 500 nm, sum contributions over 20000 points.

Position	Angle	Intensity
Centre	0	1.000000000
First null	0.100167 rad	1.404×10^{-33}
First secondary maximum	0.150568 rad	0.045032

Observation 4.2

The centre normalises to one.1.000000000000—every contribution added in phase.

Observation 4.3

The first null very nearly vanishes. 1.404×10^{-33} —the cancellation holding to thirty-three digits.

Observation 4.4

The secondary maximum matches the closed form.0.045031638 against $(\sin(1.5\pi)/(1.5\pi))^2 = 0.045031637$ —an independent check.

Observation 4.5

It is under a twenty-second of the centre, yet not zero.0.045032—only the nulls vanish; light remains between them.

Observation 4.6

What upholds it is the superposition of waves.Adding phases—unrelated to charge conservation and to detailed balance alike.

5. The Separator

The separator: does a shared name point to one person, or to one mechanism.

Observation 5.1

To one person, and the only thing shared is the person. Three fields—the balances upholding them may differ.

Observation 5.2

To one mechanism, and one should follow from another. From charge conservation to detailed balance—no such route exists.

Observation 5.3

The three are distinct roots by the criterion of Paper 300. All bear the same name—charge conservation, detailed balance, superposition. Their modes of failure differ too: change a source, unbalance the absorptivity, alter a phase.

Observation 5.4

Paper 125 runs the other way. There, one name pointing to three different people—here, one person holding three different laws. Both are cases where a shared name guarantees nothing.

Observation 5.5

One of the three is the root of Paper 214. A lens cannot increase brightness—that rests on the radiation law, not on circuits or diffraction.

Observation 5.6

This is one of the separators of Paper 481. When “Kirchhoff’s law applies” is questioned—without naming which law, the blame has three destinations.

Observation 5.7

To be honest—only a one-dimensional approximation of diffraction was computed. The Fraunhofer case—Kirchhoff’s diffraction theory itself carries a known inconsistency in over-specified boundary conditions, which is not entered here. What was confirmed is that the summation returns $(\sin u/u)^2$.

6. Roll Call and Closing

1. $i_3 = 2.307692308$ A (Computation 2.1): **conserved at the node.**
2. **Both loops close at once** (Observation 2.3): **12 and 6.**
3. **Changing a source changes the currents** (Observation 2.4): **not an identity.**
4. **Equal values leave 0.000000000000** (Computation 3.1): **an exact cancellation.**
5. **Unequal values leave ± 183.720131** (Observation 3.3): **colliding with the second law.**
6. **The centre is 1.000000000** (Computation 4.1): **added in phase.**
7. **Secondary maximum 0.045032** (Observation 4.4): **matching $(\sin u/u)^2$.**
8. **Three different balances** (Observation 5.3): **the core.**
9. **The reverse of Paper 125** (Observation 5.4): **three people against three laws.**
10. **A one-dimensional approximation** (Observation 5.7): **the inconsistency is not entered.**

Closing: Three laws bearing one man’s name are readily taken for three faces of one principle—one idea unfolding, consistent within one mind. But the fields differ—electric circuits, thermal radiation, the diffraction of light—and nothing guarantees that the physics upholding them is the same. **Circuits:** current is conserved at a node—solving a two-loop circuit with 12 V and 6 V and resistances of 4, 3 and 2 Ω gives $i_1 = 1.846153846$ A, $i_2 = 0.461538462$ A and $i_3 = 2.307692308$ A, with conservation at the node holding to twelve digits. Both loops close at once, at 12.000000000 V and 6.000000000 V: one solution satisfying two conditions. Raising the source to 24 V moves i_1 to 4.153846, so the test responds to the input. What upholds it is the conservation of charge, with the loop half coming from the potential being a function of position. **Radiation:** absorptivity equals emissivity—at 300 K on both sides, equal values leave **0.000000000000 W/m²**, an exact cancellation. Unequal values leave **± 183.720131 W/m²**, heat

flowing between bodies at the same temperature and colliding with the second law. The direction follows the inequality, symmetric in sign. At 300 K against 400 K a net of 893.084 W/m^2 survives even when they are equal, but that does not collide with the second law: whether the law is broken can only be asked at equal temperature. What upholds it is detailed balance, unrelated to the conservation of charge. Diffraction: summing the contributions of an aperture—for a $5 \mu\text{m}$ slit at 500 nm, the centre is **1.000000000**, the first null 1.404×10^{-33} and the first secondary maximum **0.045032**. The cancellation at the null holds to thirty-three digits. The secondary maximum matches $(\sin(1.5\pi)/(1.5\pi))^2 = 0.045031637$. It is under a twenty-second of the centre yet not zero: only the nulls vanish. What upholds it is the superposition of waves, unrelated to charge conservation and detailed balance alike. One thing separates them—does a shared name point to one person, or to one mechanism. To one person, and the only thing shared is the person, so the balances may differ. To one mechanism, and one should follow from another—but no route runs from charge conservation to detailed balance. The three are distinct roots by the criterion of Paper 300: charge conservation, detailed balance and superposition, with modes of failure that differ too—change a source, unbalance the absorptivity, alter a phase. Paper 125 runs the other way, one name pointing to three different people where here one person holds three different laws; both are cases where a shared name guarantees nothing. One of the three is the root of Paper 214: a lens cannot increase brightness, which rests on the radiation law and not on circuits or diffraction. This is one of the separators of Paper 481: when “Kirchhoff’s law applies” is questioned, without naming which law the blame has three destinations. To be honest—only a one-dimensional Fraunhofer approximation of diffraction was computed. Kirchhoff’s diffraction theory itself carries a known inconsistency in over-specified boundary conditions, which is not entered here; what was confirmed is that the summation returns $(\sin u/u)^2$.

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