Loop Ontology of Mendeleev's Table | LOM

Abstract

This paper reinterprets the periodic table of elements through the framework of Loop Ontology. From the axiom Something Is, Nothing Isn't, existence requires closure: indivisible loops that prevent dissolution into non-being. Atoms are nested closures of nuclear and electronic loops, with stability emerging from complete symmetry and reactivity arising from dangling or incomplete outer loops. Inert gases represent perfect closures, while radioactive elements result from oversaturated or unstable nuclear loops. This ontological reinterpretation aligns with experimental chemistry and physics while offering a unifying first-principle foundation.

1. The Axiom

Axiom: Something Is, Nothing Isn't. Consequences: 1. Existence cannot leak into nothing. 2. Every stable entity requires closure. 3. The minimal closure is the loop. 4. Complex structures emerge as nested or coupled loops.

2. Atomic Loops

1. Hydrogen: The simplest closure — a proton loop with a single electron looped around it. 2. Helium: A stable closure of two protons, two neutrons, and two electrons; all loops balanced. 3. Progression of Elements: Each step up the table introduces additional nuclear and electronic loops. Stability depends on how well these loops achieve closure. 4. Electron Shells: Not abstract probability clouds but closures of electron loops around nuclear loops.

3. Stability and Reactivity

1. Closed-shell stability: Inert gases (Ne, Ar, Kr, Xe) are complete closures with no dangling loops, hence minimal reactivity. 2. Reactive elements: Halogens and alkali metals exhibit incomplete closures — one dangling loop seeks closure with another atom. 3. Radioactivity: In heavy elements, oversaturated nuclear loops strain closure. Instability manifests as loop breakdown, ejecting particles until a more stable closure is reached.

4. Nested Loop Patterns

- Atoms are stable when nuclear loops and electron loops form coherent closure. - Molecules are higher-order closures: atoms share dangling loops to complete symmetry. - Periodic repetition: The periodic table encodes recurring closure patterns across scales.

5. Why LOM Matters

5.1 Unification: LOM bridges physics and chemistry. Nuclear forces, electron shells, and chemical bonds are not separate phenomena but expressions of closure. 5.2 Predictive Clarity: LOM reframes stability and reactivity as loop geometry: complete closures = stability, dangling closures = reactivity. This provides an intuitive yet rigorous principle for chemical prediction. 5.3 Nuclear Understanding: Radioactivity is no longer a statistical quirk but a structural inevitability: oversaturated loops cannot maintain closure. 5.4 Ontological Grounding: LOM removes arbitrary interpretation. Atoms exist not because of "rules of quantum mechanics," but because being requires closure. 5.5 Toward New Applications: - Predict new stable isotopes. - Guide material science by designing loop closures. - Provide a unified language across scales of physics, chemistry, and cosmology.

6. Conclusion

The Loop Ontology of Mendeleev reinterprets the periodic table as a map of closures, nested loops that encode the persistence of being. Stability, reactivity, and radioactivity are no longer descriptive categories but necessary consequences of closure dynamics. Inert gases embody perfect closure, while unstable isotopes reveal the failure of oversaturated loops. This unification of ontology, physics, and chemistry establishes LOM as both a clarifying reinterpretation and a fertile ground for prediction.