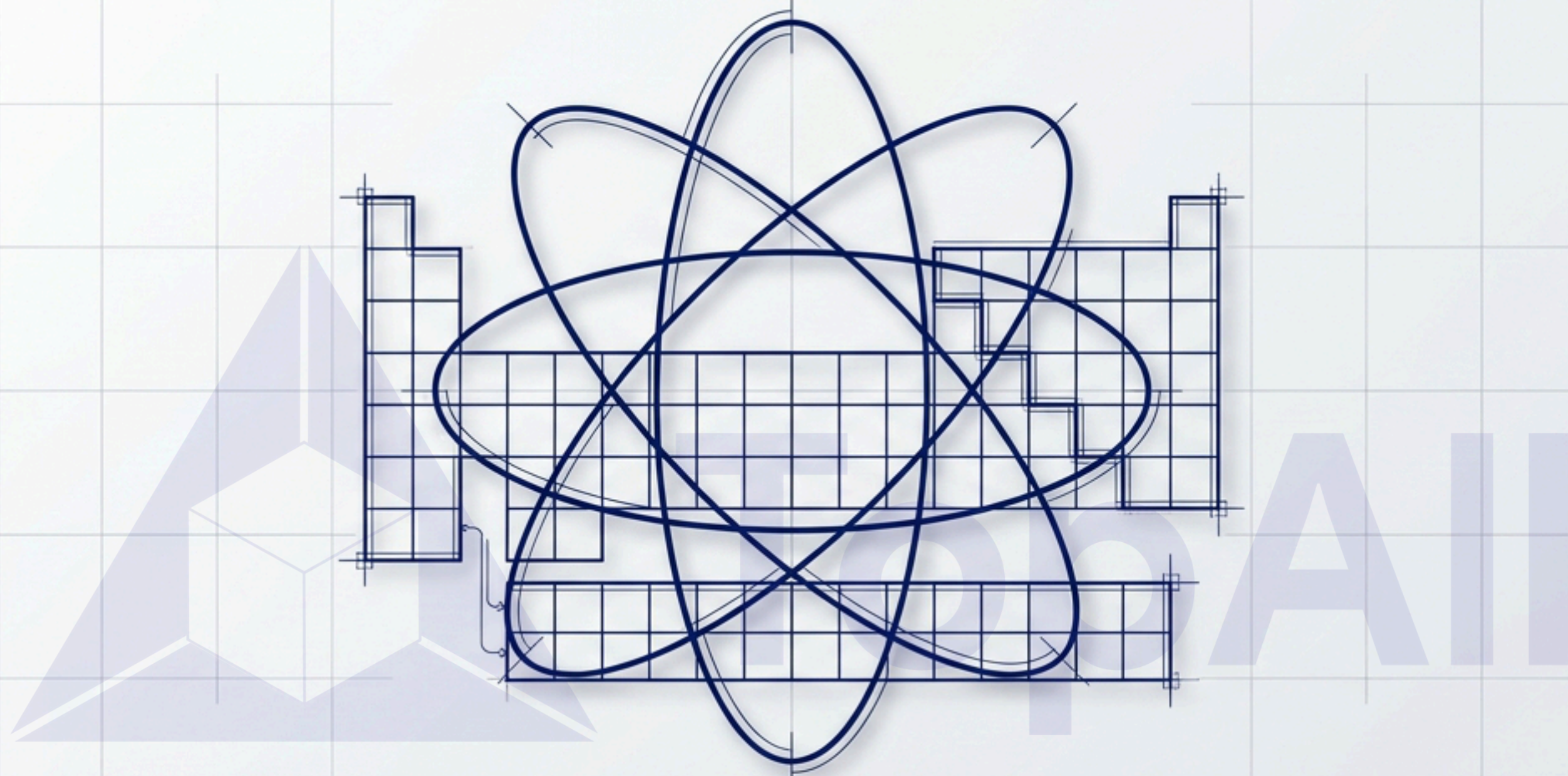




Atomic Number Rules the Modern Table

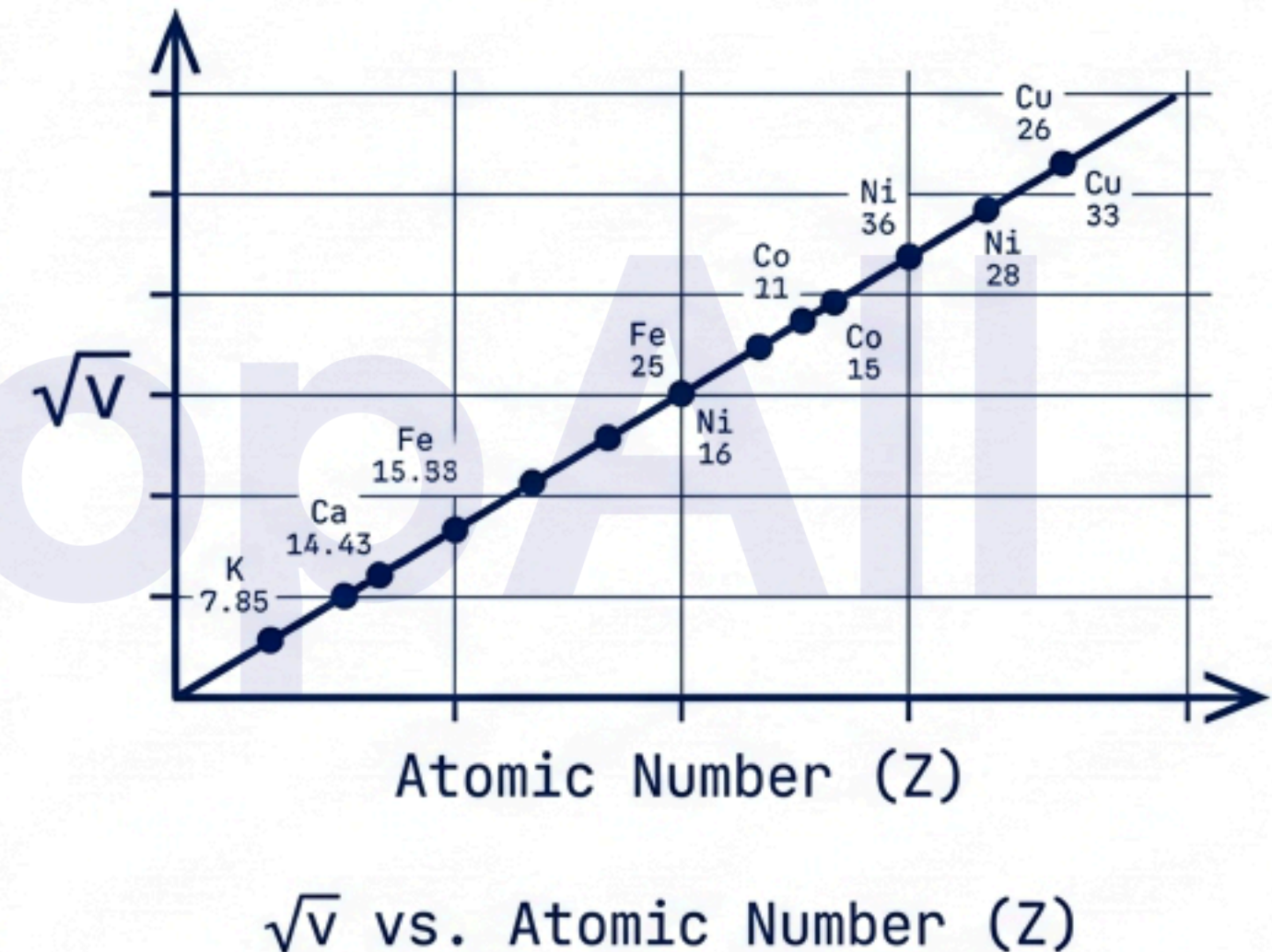
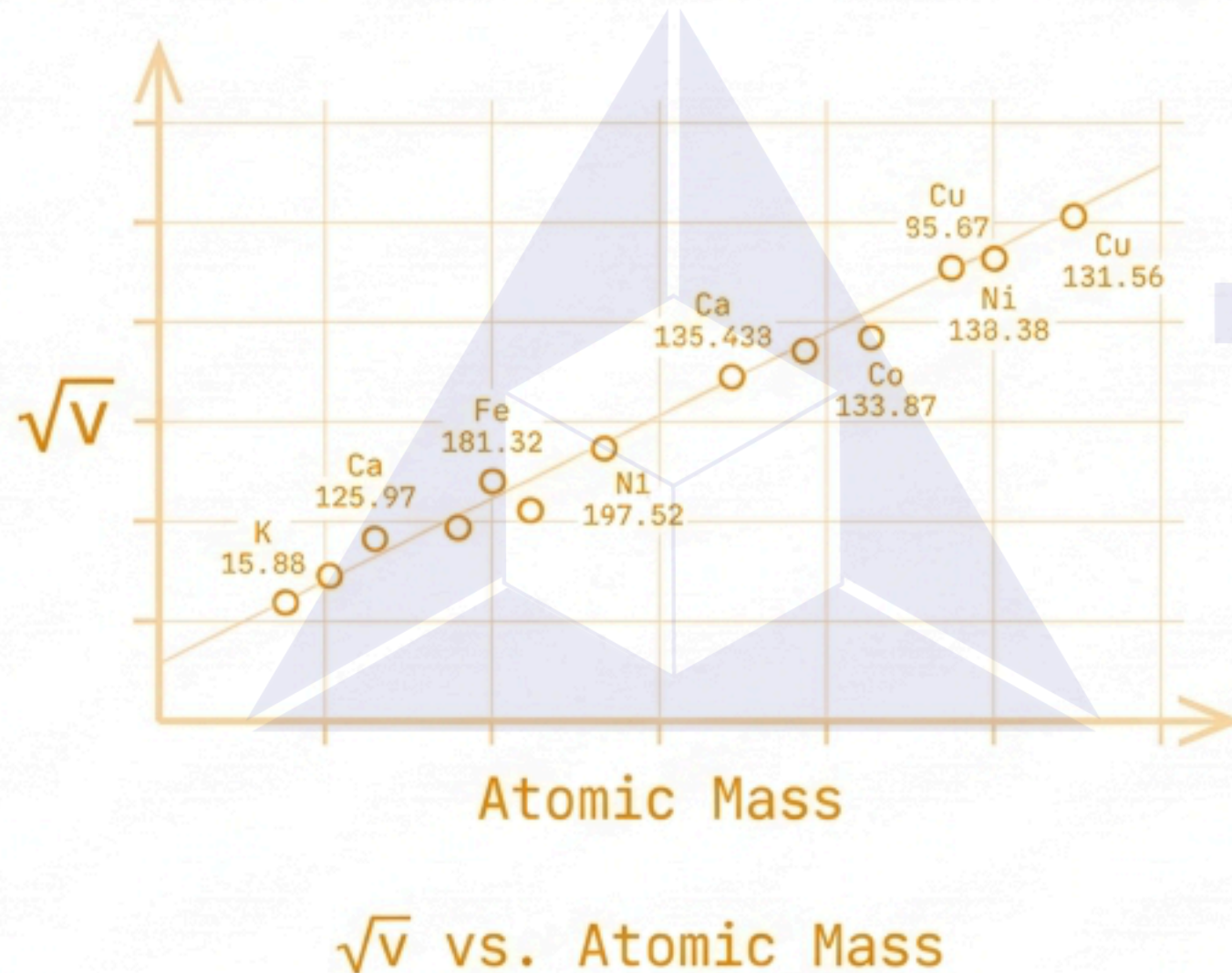
The Transition to the Modern Periodic Law and Present Periodic Table

Structural Chemistry Blueprint

The 1913 Anomaly: Moseley's X-Ray Spectra



English physicist Henry Moseley observed regularities in the characteristic X-ray spectra of elements, fundamentally shifting the basis of chemical organization.



The frequency of emitted X-rays perfectly correlated with atomic number (Z), not atomic mass.

$$\sqrt{v} \propto Z$$

A Fundamental Shift: Mass vs. Number

! Previous Assumption

Basis: Atomic Weight (Mass)

Champion: Dmitri Mendeleev

The Flaw: Produced ordering anomalies (e.g., placing heavier Iodine after lighter Tellurium just to match chemical properties).

Modern Reality

Basis: Atomic Number (Z)

Champion: Henry Moseley

The Truth: Represents the exact, fundamental nuclear charge (number of protons). Resolves all structural anomalies.

The Rule of Organization



Modified from Mendeleev

The physical and chemical properties of the elements are periodic functions of their atomic numbers.

By defining elements by Z (nuclear charge), the table perfectly aligns with quantum mechanics and electronic configurations—a reality unknown to 19th-century chemists.



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Key Highlights

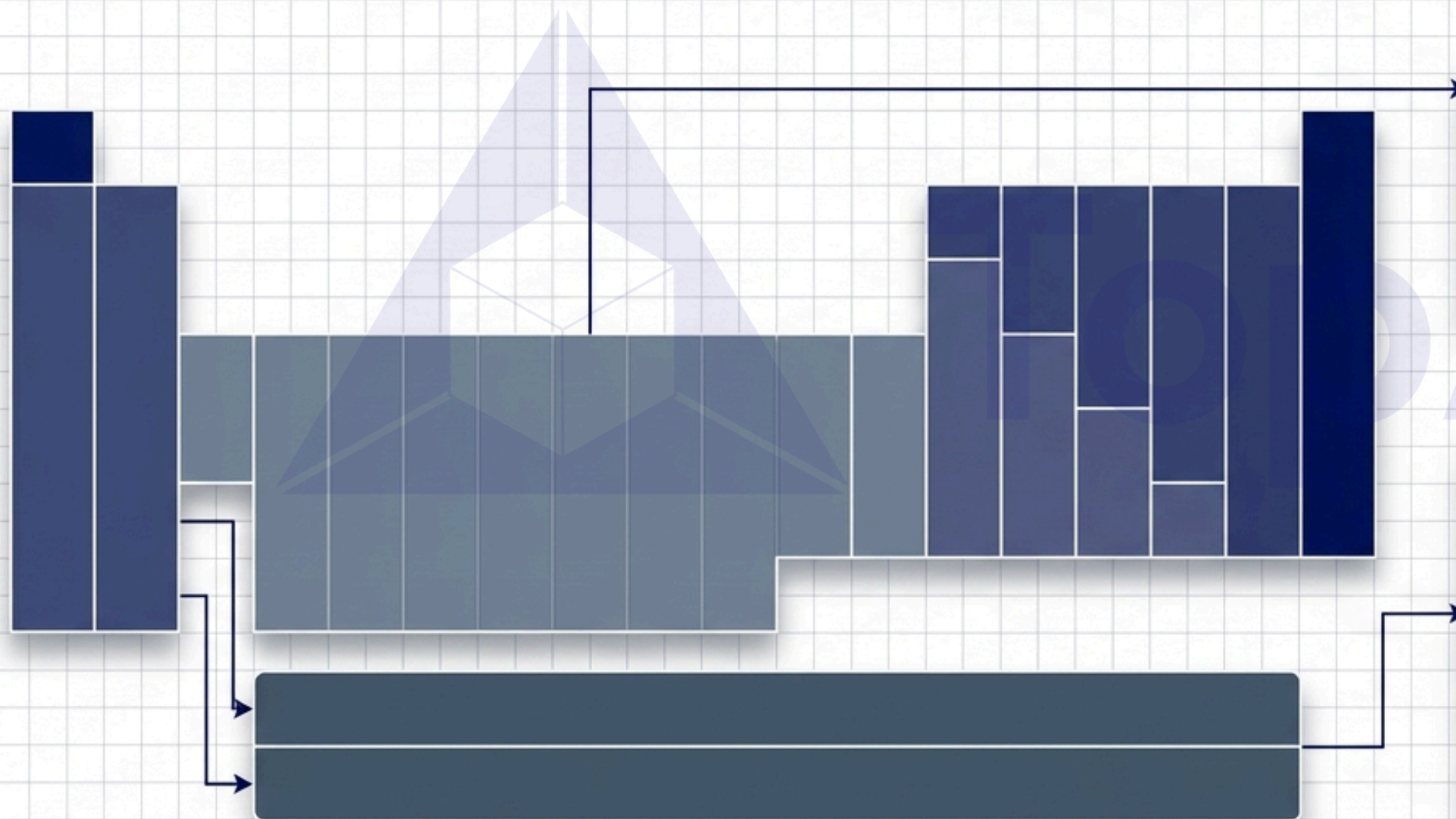
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The Long Form Periodic Table



The most convenient and widely used version of the periodic table.



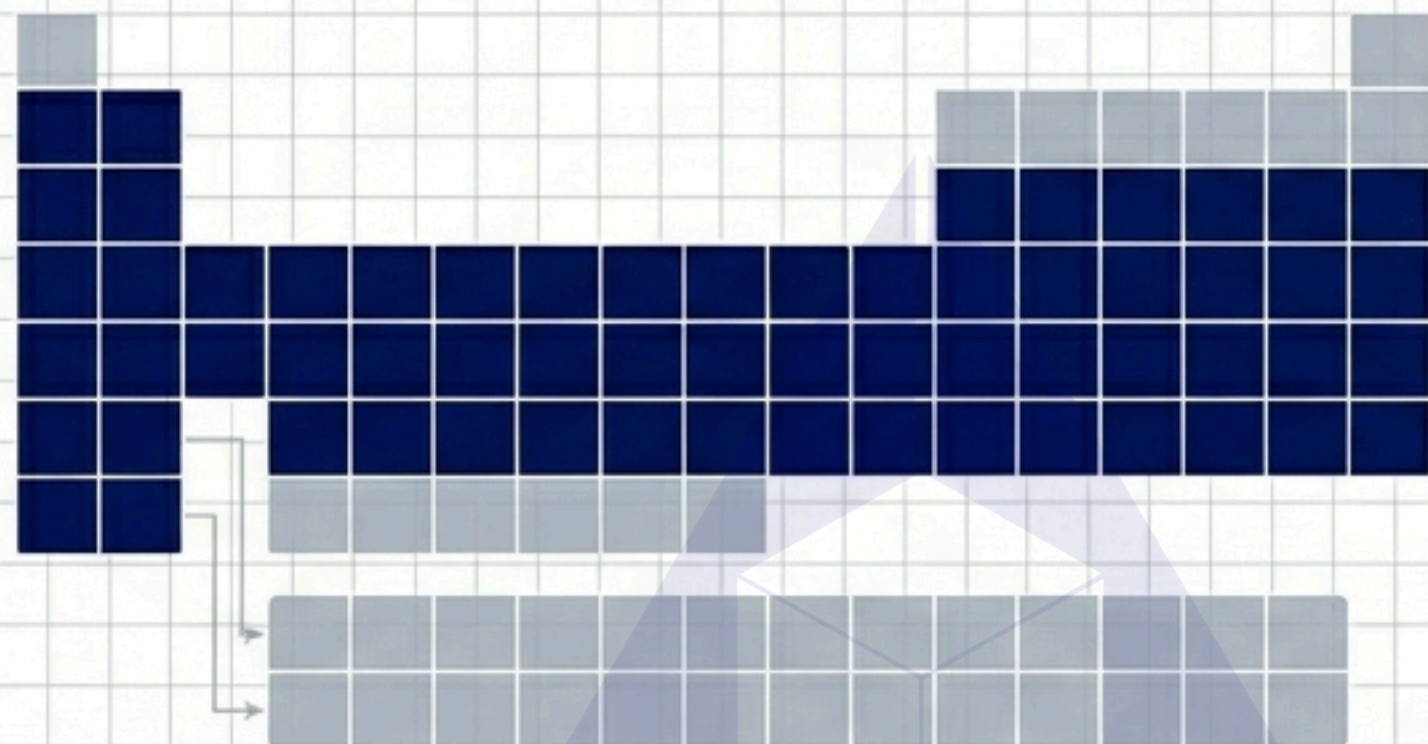
Structure:

Organizes elements strictly by their electronic configuration.

Separation:

f-block elements (Lanthanoids and Actinoids) are placed in separate panels at the bottom to maintain structural integrity and keep similar elements in single columns.

Anatomy of the Table: Two Axes

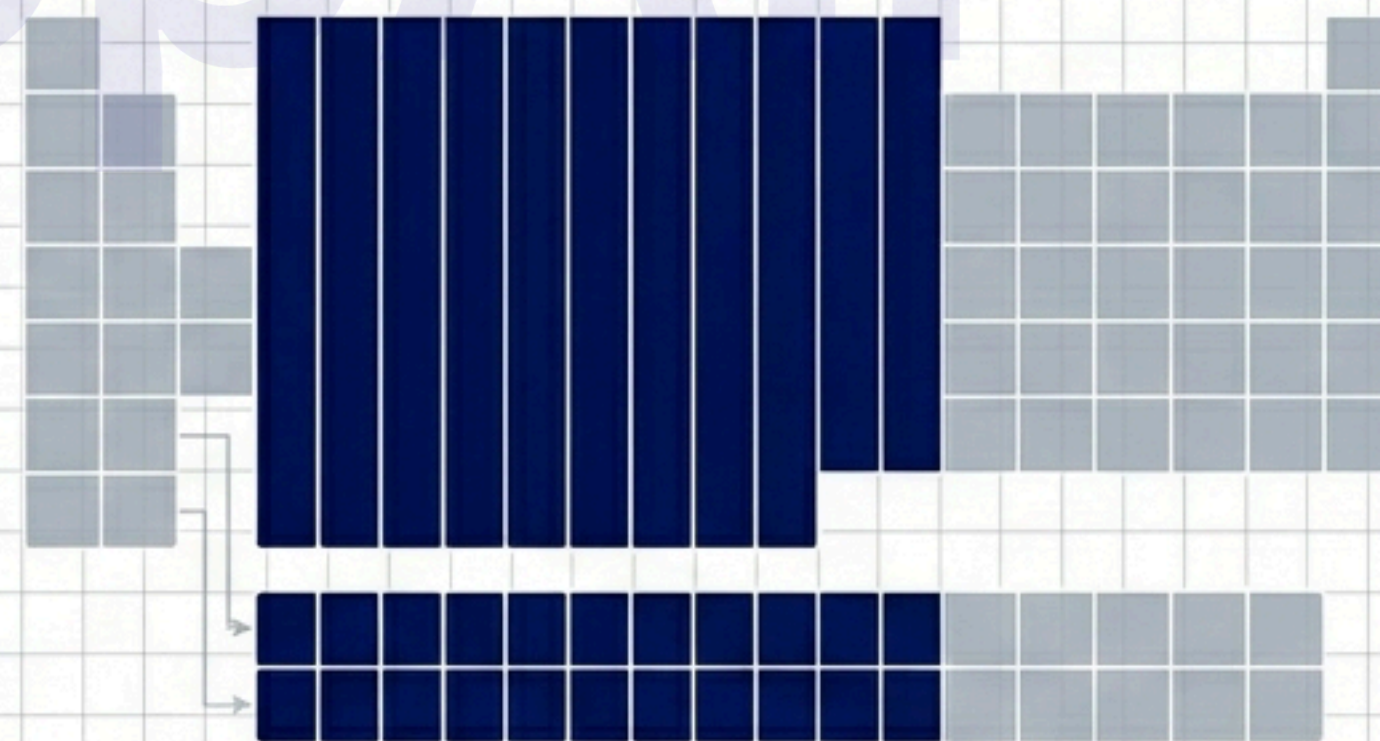


7 Horizontal Rows (Periods)

Corresponds to the highest principal quantum number (n) of the elements in that period.

18 Vertical Columns (Groups / Families)

Contains elements possessing similar outer electronic configurations, resulting in similar chemical properties.



Standardizing the Grid: IUPAC Nomenclature

To eliminate the confusion of multiple regional numbering schemes, the International Union of Pure and Applied Chemistry (IUPAC) established a universal standard.

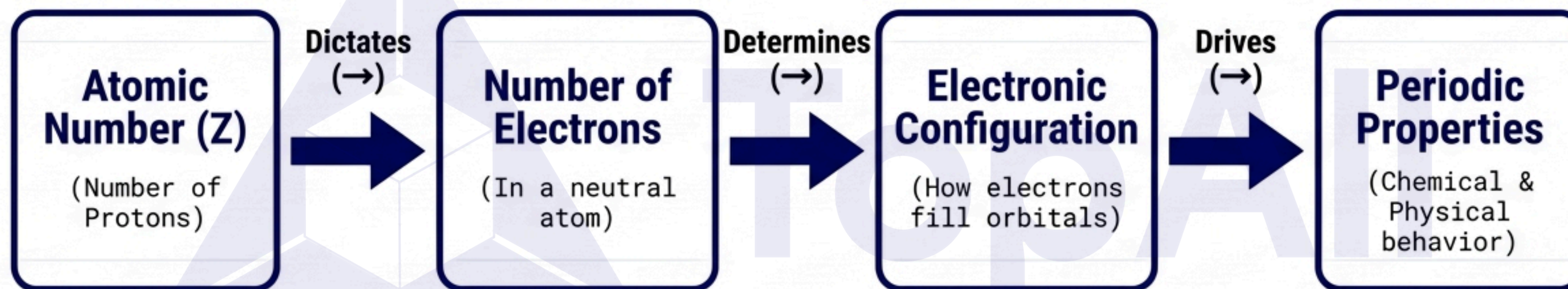
~~IA, VIIA, VIII, IB, VIIB, 0~~

1, 2, 3 ... 13, 14, 15, 16, 17, 18

Key Fact:

All groups are simply numbered 1 to 18 sequentially from left to right.

The Causal Chain of Chemistry



The structure of the Modern Periodic Table is the inevitable consequence of quantum mechanics. Properties depend absolutely on atomic number and electronic configuration.



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