

Structure of the Atom, Reconsidered

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Since middle school, we learned that the atom resembles the solar system: positive nucleus surrounded by negatively charged electrons. That feature has been retained for a century, although modified somewhat by quantum mechanical considerations.

I present multiple reasons to challenge that long-standing model. Most are based on simple logic. Straightforward arguments imply that the model may be fundamentally unstable, and that persisting reliance on that model has led to unnecessarily complex interpretations of simple physico-chemical phenomena.

I suggest a different atomic structure, not significantly different from what leading chemists proposed at the time Niels Bohr advanced the solar-system model. Those chemists rejected the solar-system model as failing to account for even the simplest of chemical reactions. It was the era of physics, however, and the arguments of chemists fell on deaf ears.

In the proposed model, the atom is not spherical; it has the shape of a Platonic solid, *e.g.*, a cube. A critical feature of the proposed model is stability. Unlike the solar system model, which lacks stability (*e.g.*, negative electrons should collapse onto positive nucleus), the proposed model is ultimately stable. It doesn't collapse or explode.

I discuss the ultimate need for stability, and show that the proposed model readily explains many basic physicochemical phenomena without the need to invoke complicated assumptions.