

methodology

sized matter - perceptions of the extreme unseen

<http://www-personal.umich.edu/~janhande/sizedmatter/sizedmatter.htm>

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jan-henrik andersen

The realization that subatomic particle matter and energy has no commonly accepted visual presence, made the task of suggesting a visual nomenclature, a daunting, but irresistible endeavour.

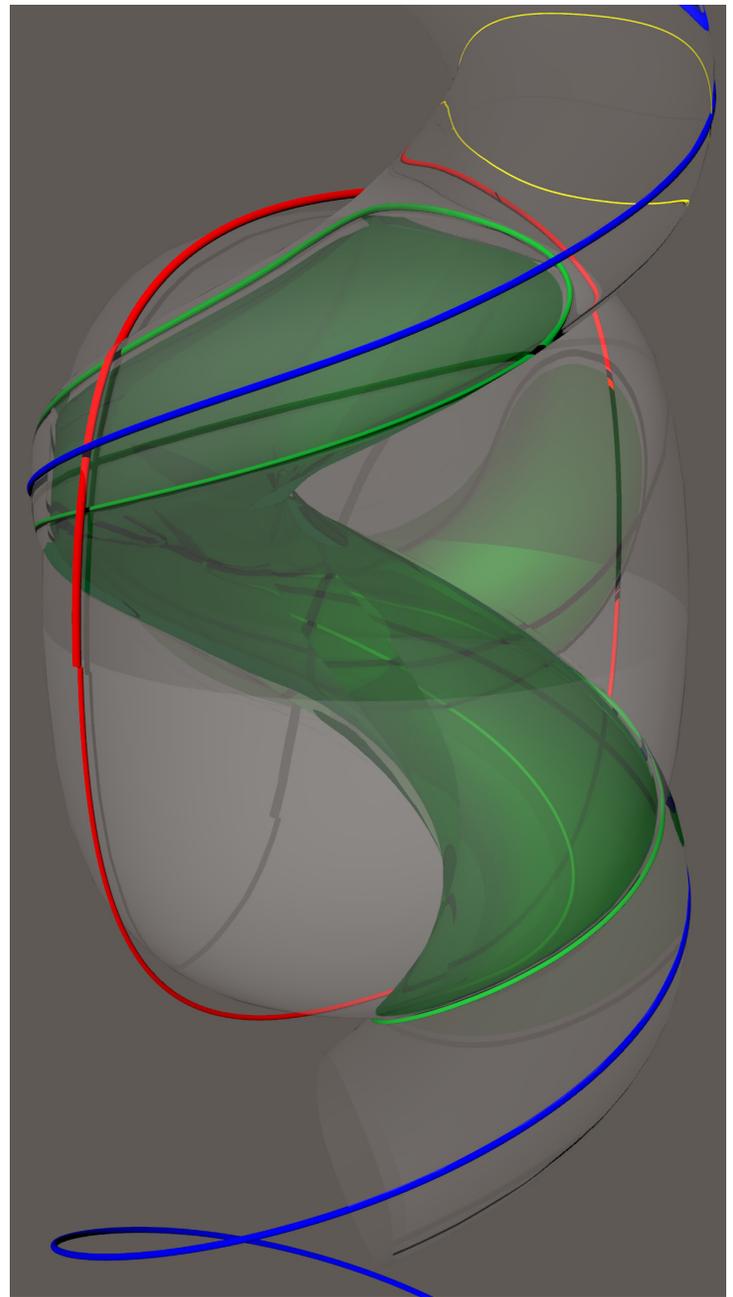
As a foundation premise; the forms and form system must hold up to critique from both science and visual arts and design. Good science requires referred documentation to enable verification through procedural repetition, and good design hold you to culturally guided aspects of emotional, behavioral and visceral comprehension. But what is the consequence of this forced relationship between science and design? Is it at all plausible to marry the scrutiny of science with a visual expression fueled by creative joy? The answer may surface in granting an allowance for a flux between an intellectual and emotional point of view in experiencing the work.

The visual notion of an atom is firmly anchored by the common simplification of Niels Bohr's atomic model where the electrons orbit a nucleus of protons and neutrons. Although this image has installed permanent impressions and curiosity in people, transcending cultures and generation, the image conveys a reality far from the true proportions, dimensions, velocities and energies etc. at play in a real atom. But we don't mind, because we understand enough. Countless, not the least children, has searched for deeper understanding based on this entry level image. Yet the impact of this simplification is a wild ambition indeed to measure up to; a visual description of the subatomic world for everyone to comprehend and enjoy; stripped naked of the chalk board presence of mathematical formulas. To limit the possibilities and set a creative space, the design specification read:

- 1. All the forms should be generated by one simple visual element, preferably expressed as ONE. The smallest whole number as an expression of a non-fractional value.**
- 2. The particles must have the same basic form, yet reflect differences in mass, parities, functions and behavior.**
- 3. There must be logical coherence between the particles according to the categorization and decay patterns of the Standard Model, and yet be open for interpretation of Supersymmetry, String Theory, Gravitational forces and Higgs Field/Particle.**
- 4. The particles spin and directional velocity, requires a multidirectional visual quality.**

Thinking in points, lines, surfaces and volumes, these criteria excluded the obvious spherical form as it floats in space, tied to its origin without a directional quality, but the contained space of the sphere pointed to that the particle form required a spatial presence with a similar, economical form.

By experimenting and massaging the variables of a Lamé curve to create a unique geometry $[(x/a)^m + (y/b)^m = 1]$, and by mirroring and rotating this curve in space, the curve generates a super quadric ellipsoid. The super ellipsoid has interesting and unique properties as a solid. The point of gravity is offset vertically (above) in relationship to the radial origin of the ellipsoid's apices. When placed upon a horizontal surface, this causes the solid to righting itself as the shape demonstrates an inert geometric equilibrium.



a. The red curve is the Lamé curve; $(x/a)^m + (y/b)^m = 1$, which gives the overall form to the super quadric ellipsoid. This constitutes the geometric boundary of each particle.

b. The blue curve gives the degree of particle spin.

c. The yellow curve is identical with the initial Lamé-based outline curve. The curve is extruded along the spin curve (blue), with the major axis polar to the center line of the super quadric, to generate the visual geometry found as positive and negative space (green surface) in the particle parities. The particle is formed by passing through it's own geometry. The number of core elements indicate the generations of Fermions.

d. The green curve is the resulting curvilinear vertex from the intersection between the super quadric and the outline base curve extruded along the spiraling spin curve. This curve forms the basis for string interpretations and interactions with Higgs field.

janhande@umich.edu