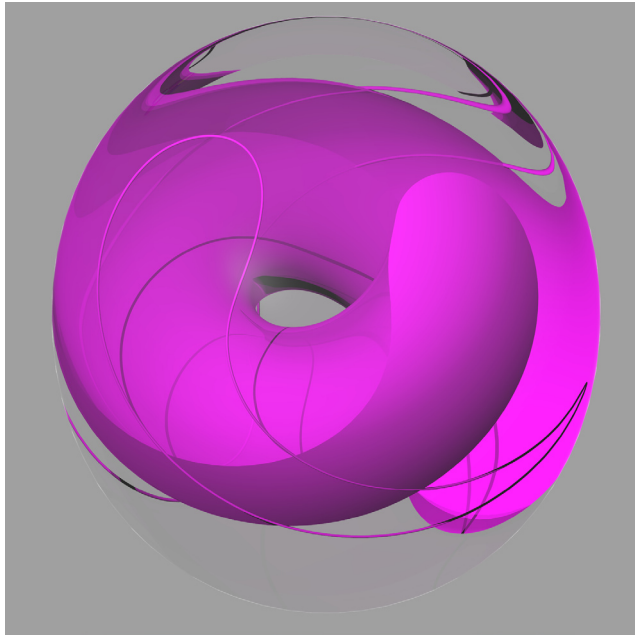


**RIGHT**

*Supersymmetric  
Anti Green Up Quark.*  
Ink on canvas 42x42.

**FRONT COVER**

Detail of *The Day  
They Found Higgs.*  
Red proton (2 Up Quarks  
and 1 Down Quark in  
red) and anti red (Cyan)  
anti proton in super  
collider, generating a  
traceable Higgs boson.  
An event yet to  
be documented.  
Ink on canvas, 42x54.



The exhibition is the result of 3 years of collaboration between the Department of Physics and the School of Art and Design, initiated by Associate Dean Sherri Smith, and supported by Dean Bryan Rogers.

I would like to thank Office of the Vice President for Research and Dean Rogers for their financial support, my colleagues, in particular Professors Dennis Miller, Sherri Smith and Dwayne Overmyer for their support, help and constructive critique. Sincere thanks to Lenee Lane, Lois Kane, and of course to my colleagues Professors Gordon Kane and David Gerdes in the University of Michigan Department of Physics. Thanks also to the help from Studio Coordinators Ken Brown in the sculpture lab and David Liske in the digital print shop, and the rest of the School's great support and exhibition staff.

**JAN-HENRIK ANDERSEN**

Send purchase inquiries to [janhande@umich.edu](mailto:janhande@umich.edu).  
Please note number or title.



VISUAL REPRESENTATION OF SUBATOMIC PARTICLE  
MATTER AND ENERGY

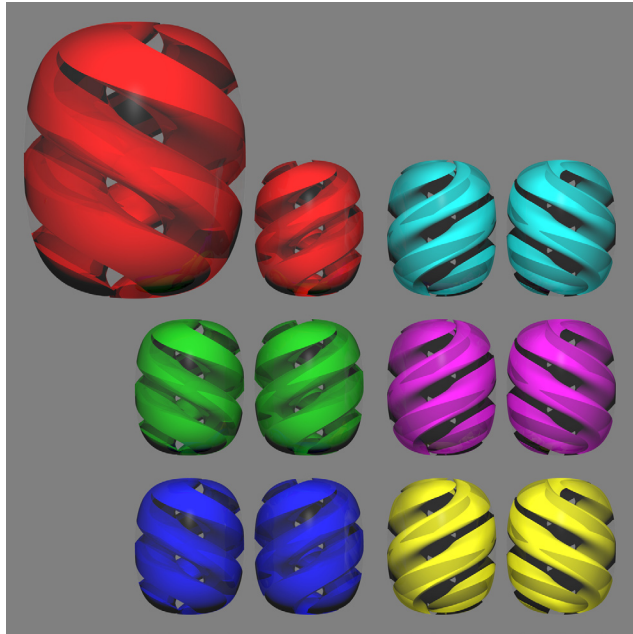
**JAN-HENRIK ANDERSEN**

FEBRUARY 13 THROUGH MARCH 13

JEAN PAUL SLUSSER GALLERY  
UNIVERSITY OF MICHIGAN  
SCHOOL OF ART AND DESIGN

**RIGHT**

The top quark shown in left and right spin, three color flavors and their respective anti color as anti particles. The color system is additive.

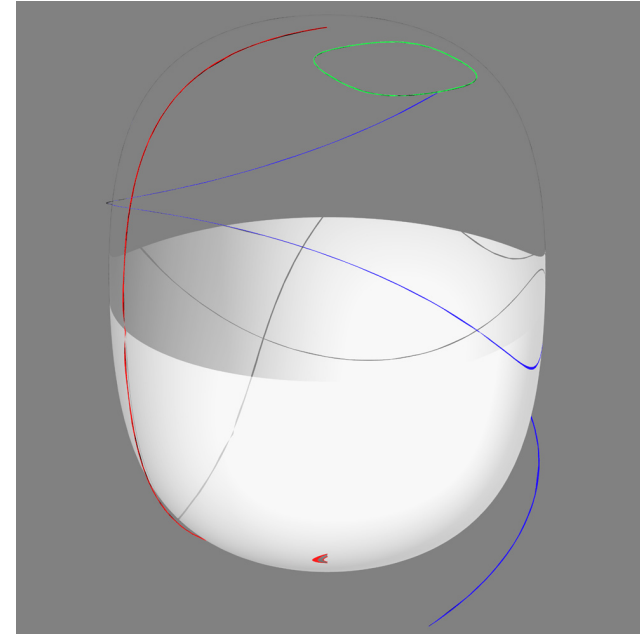


The nature of the work is to lift the veil on the optically impossible task of visually observing subatomic particles by translating their properties and behavior, known as the Standard Model of subatomic physics, into a coherent visual three-dimensional language. Since no one has ever seen, nor will anyone ever see anything as small as a Quark or a Neutrino, one could argue that they could look like anything, if they have “looks” at all. But their properties and behavior can offer the basis for a rational discussion of their visual presence. Unfortunately this is not enough, since one can’t say with any certainty that there is only one visual solution to how one represents properties like spin, mass, charge, or color.

My proposal is to represent the particles visual context where these properties represent the syntax, and then work to reflect the meaning of the properties as visual elements within an order. According to physics there is nothing smaller than these particles, - they are the bottom line of anything and everything. Yet they occur in multitudes as they form groups and subgroups, parities and symmetries, anti-particles and supersymmetries, they decay from one state to another, changing properties, and they move very fast.

**LEFT**

By using the simple equation of a super ellipse, based on a Lamé curve;  $(x/a)^m + (y/b)^m = 1$ , where  $a$  and  $b$  are the size of the major and minor axes (positive real numbers), and  $m$  is a rational number, and by mirroring and rotating this curve in space, an ellipsoid was generated, which in combination with its own curvature creates all forms in the exhibit.



The exhibition shows visual representation of the basic particle groups; the Fermions (Quarks and Leptons) and Bosons. In addition there are examples of the visual representation of supersymmetric particles, the Graviton and Higgs boson. The 38 images are mid size and large digital ink on canvas and art paper. There are also some smaller works in rapid prototyping and bronze. All the works were created using a computer NURBS modeler with radiosity rendering in displayed size 1:1.

The following statements constituted the primary premises of my visual problem;

- 1 all the forms must be generated by one simple visual element,
- 2 the particles must have the same form yet be different;
- 3 there must be logic coherence between the particles according to the categorizations and decay patterns of the Standard Model
- 4 their spin in combination with great directional velocity requires a multi directional visual quality as illustrated above.