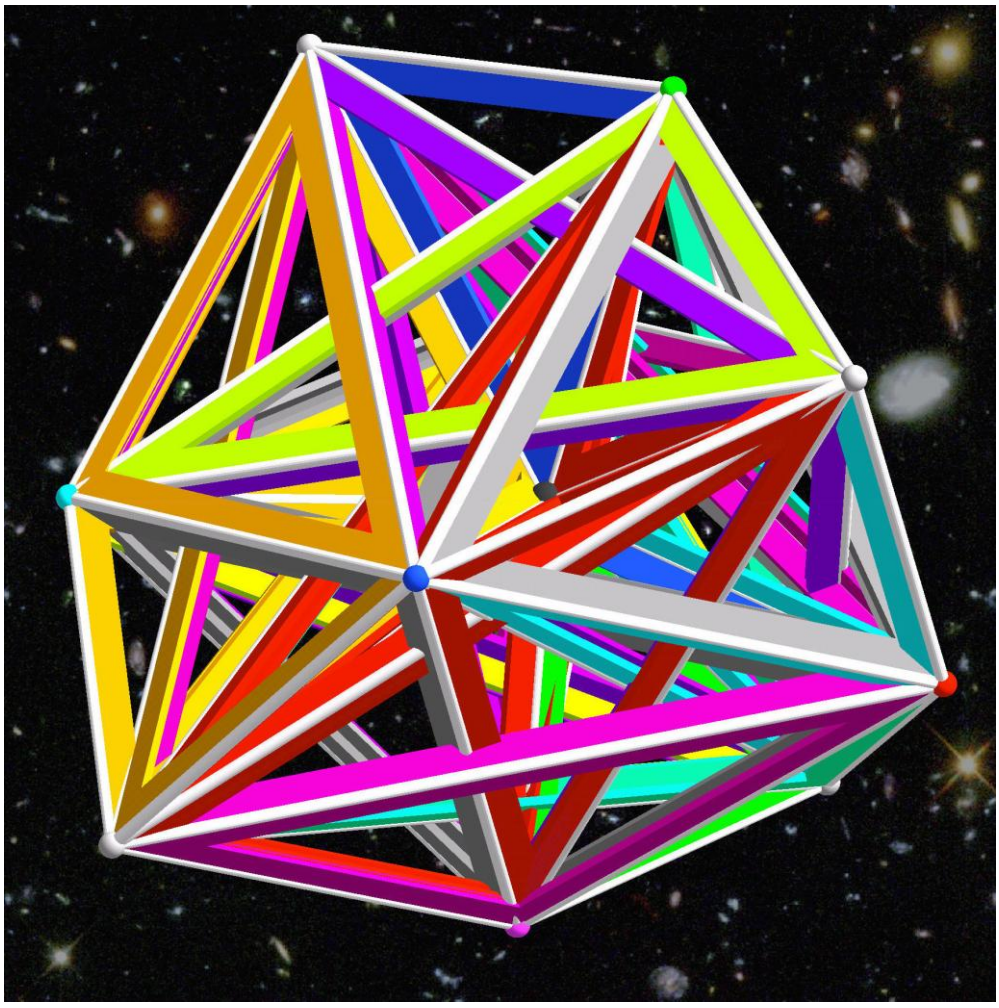
The Regular Hendecachoron

Computer model constructed by Carlo Séquin, UC Berkeley.

This hendecachoron (a literal translation of "11-cell" into Greek) is a regular, self-dual, 4-dimensional polytope composed from eleven non-orientable, self-intersecting hemi-icosahedra. This object also has 11 vertices (shown as spheres), 55 edges (shown as thin cylindrical beams), and 55 triangular faces (shown as cut-out frames). Different colors indicate triangles belonging to different cells. This intriguing object of high combinatorial symmetry was discovered in 1976 by Branko Grünbaum and later rediscovered and analyzed from a group theoretic point of view by geometer H.S.M. Coxeter. Freeman Dyson, the renowned physicist, was also much intrigued by this shape and remarked in an essay: "Plato would have been delighted to know about it."



The hendecachoron has 660 combinatorial automorphisms, but these can only show themselves as observable geometric symmetries in 10-dimensional space or higher. In this image, the model of the hendecachoron is shown with a background of a deep space photo of our universe, to raise the capricious question, whether this 10-dimensional object might serve as a building block for the 10-dimensional universe that some string-theorists have been postulating.