Resonances of Fermions and Bosons: Exceptional Lie Group E8 and Monster Group

Mysticism: Where Science, Art and Religion Meet

What Are Fermions and Bosons?

- In particle physics, a fermion is a particle that follows Fermi–Dirac statistics. Generally, it has a half-odd-integer spin: spin 1/2, spin 3/2, etc. In addition, these particles obey the Pauli exclusion principle. Fermions include all quarks and leptons and all composite particles made of an odd number of these, such as all baryons and many atoms and nuclei.
- In particle physics, a boson (/ˈboʊzɒn/[1] /ˈboʊsɒn/[2]) is a subatomic particle whose spin quantum number has an integer value (0,1,2 ...).
- Every observed subatomic particle is either a boson or a fermion.

Resonance

- Resonance describes the phenomenon of increased amplitude that occurs when the frequency of an applied periodic force (or a Fourier component of it) is equal or close to a natural frequency of the system on which it acts.
- When an oscillating force is applied at a resonant frequency of a dynamic system, the system will oscillate at a higher amplitude than when the same force is applied at other, non-resonant frequencies.

Group Theory and the Classification of Finite Simple Groups

- In abstract algebra, group theory studies the algebraic structures known as groups. The concept of a group is central to abstract algebra: other well-known algebraic structures, such as rings, fields, and vector spaces, can all be seen as groups endowed with additional operations and axioms. Groups recur throughout mathematics, and the methods of group theory have influenced many parts of algebra. Linear algebraic groups and Lie groups are two branches of group theory that have experienced advances and have become subject areas in their own right.
- Various physical systems, such as crystals and the hydrogen atom, and three of the four known fundamental forces in the universe, may be modelled by symmetry groups. Thus group theory and the closely related representation theory have many important applications in physics, chemistry, and materials science. Group theory is also central to public key cryptography.
- The early history of group theory dates from the 19th century. One of the most important mathematical achievements of the 20th century was the collaborative effort, taking up more than 10,000 journal pages and mostly published between 1960 and 2004, that culminated in a complete classification of finite simple groups.

Classification of Finite Simple Groups

- In mathematics, the classification of the finite simple groups is a result of group theory stating that every finite simple group is either cyclic, or alternating, or it belongs to a broad infinite class called the groups of Lie type, or else it is one of twenty-six or twenty-seven exceptions, called sporadic. The proof consists of tens of thousands of pages in several hundred journal articles written by about 100 authors, published mostly between 1955 and 2004.
- Simple groups can be seen as the basic building blocks of all finite groups, reminiscent of the way the prime numbers are the basic building blocks of the natural numbers. The Jordan–Hölder theorem is a more precise way of stating this fact about finite groups. However, a significant difference from integer factorization is that such "building blocks" do not necessarily determine a unique group, since there might be many non-isomorphic groups with the same composition series or, put in another way, the extension problem does not have a unique solution.

Finite Simple Groups Classification

Theorem — Every finite simple group is isomorphic to one of the following groups:

- a member of one of three infinite classes of such, namely:
- the cyclic groups of prime order,
- the alternating groups of degree at least 5,
- the groups of Lie type
- one of 26 groups called the "sporadic groups"
- the Tits group (which is sometimes considered a 27th sporadic group).

The Fischer-Griess Monster or Friendly Giant Sporadic Group

- In the area of abstract algebra known as group theory, the monster group M (also known as the Fischer–Griess monster, or the friendly giant) is the largest sporadic simple group, having order

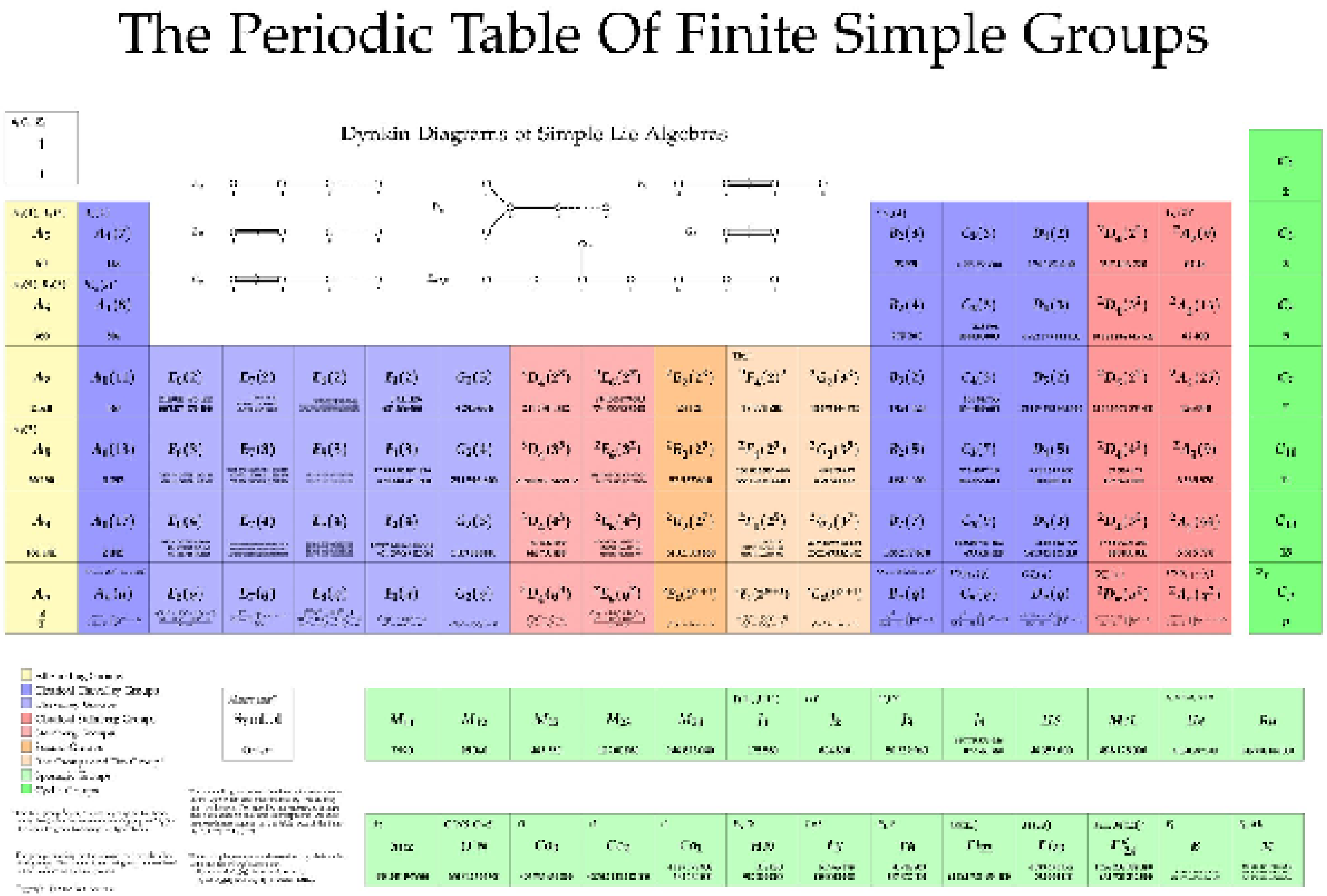
246 · 320 · 59 · 76 · 112 · 133 · 17 · 19 · 23 · 29 · 31 · 41 · 47 · 59 · 71

= 808,017,424,794,512,875,886,459,904,961,710,757,005,754,368,000,000,000

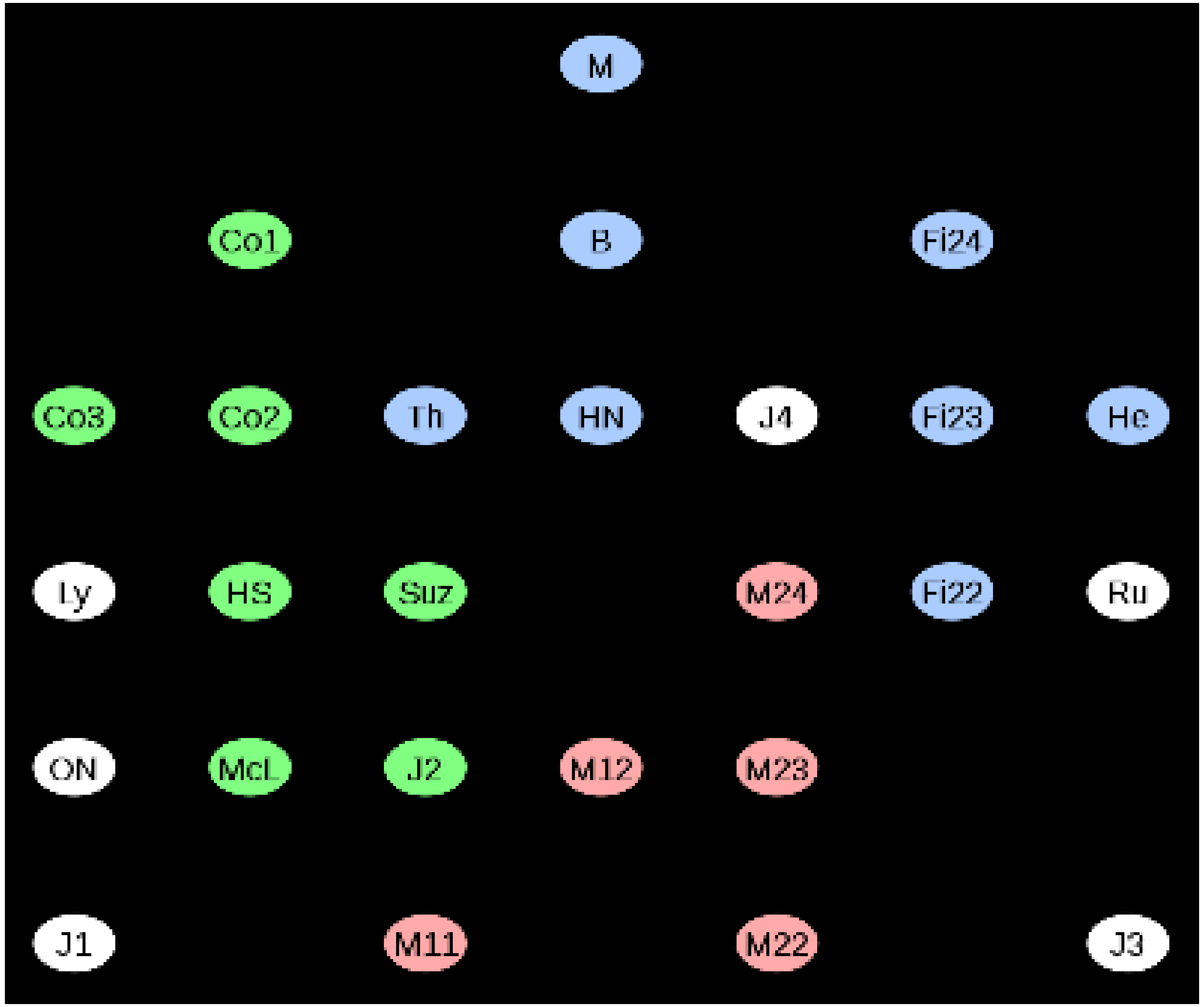
≈ 8×10^53.

- The finite simple groups have been completely classified. Every such group belongs to one of 18 countably infinite families, or is one of 26 sporadic groups that do not follow such a systematic pattern. The monster group contains 20 sporadic groups (including itself) as subquotients. Robert Griess, who proved the existence of the monster in 1982, has called those 20 groups the happy family, and the remaining six exceptions pariahs.

Periodic Table of Finite Simple Groups



26 Sporadic Simple Finite Groups



Exceptional Lie Group E8 and Fermions

- In mathematics, E8, an eight dimensional space, is any of several closely related exceptional simple Lie groups, linear algebraic groups or Lie algebras of dimension 248; the same notation is used for the corresponding root lattice, which has rank 8. The designation E8 comes from the Cartan–Killing classification of the complex simple Lie algebras, w, an hich fall into four infinite series labeled An, Bn, Cn, Dn, and five exceptional cases labeled G2, F4, E6, E7, and E8. The E8 algebra is the largest and most complicated of these exceptional cases.
- In atomic particle physics, there is evidence that all subatomic fermions are resonance states of E8; Einstein popularized energy being proportional to mass times the speed of light squared, but in reality it is energy that is proportional to a mass tensor 248x248 multiplied by the mass of the particle times the speed of light squared that is the actual relationship

Two Factoids re 26 Real Dimensional Universe

- In 1962 Richard Feyman taught a theoretical physics class at Cal Tech on developing a quantum theory of gravity; he started out with a spin zero graviton theory and showed it had to be inconsistent and hence discarded, then moved to a spin one graviton theory and showed it also was inconsistent and had to discarded, but then arrived at a spin two graviton theory and could not show it was inconsistent
- In 1970 Claude Lovelace at Rutgers University was studying a theoretical model of resonating bosons that were also consistent with a spin two graviton theory, and realized that the theory was inconsistent in 3,4,5,…,25 dimensions but was self consistent in 26 dimension

The 26 Real Dimensional Symplectic Universe

26 REAL DIMENSIONAL SYMPLECTIC[1] UNIVERSE	
10 Matter Dimensions	**10 Dark Matter Dimensions**
Space-Time 4 Dimensions (x,y,z,ict[2])	Space-Time 4 Dimensions i * (x,y,z,ict) = (ix,iy,iz,-ct)
Symplectic Calabi-Yau Manifold 6 Compactified Dimensions 3 Holes – Genus 3 Hodge Diamond (9,11,6,7)	Symplectic Calabi-Yau Manifold 6 Compactified Dimensions 4 Holes – Genus 4 Hodge Diamond (17,12,21,12)
Symplectic Calabi-Yau Manifold 6 Synchronizing Compactified Dimensions 8 Holes – Genus 8 Hodge Diamond (8,23,21,17)	

[1] Symplectic = real and imaginary pairs.
[2] ict = √(-1) * speed of light * time.

Octonions, E8, and the 26 Real Dimensional Symplectic Universe

- In the 26 Real Dimensional symplectic universe, there are eight subspaces of three real dimensions each; each of these subspaces is paired with another, forming real and imaginary parts of a single three complex dimensional subspace, so there are four subspaces of three complex dimensions
- Octonions are tied to all five exceptional Lie groups, as well as to the underlying geometry of the symplectic universe
- Planck observed that for bosons their energy equals their frequency of vibration times the Planck constant; in fact, this should be the Planck 248 x 248 tensor multiplied by the 248 modes of resonance
-

Mathematical Physics of the Monster Group: Occuping the Same Space, and Cloaking

- Each of the representations of the Monster Group can be realized in mathematical physics as a mode of vibration
- The universe locally has a set pattern of vibrations that jiggle the local 26 real dimensional symplectic space
- If you increase the energy of vibration locally, you can move to higher modes of vibration; physically this corresponds to having excited particles occupying the same space as non excited particles, i.e., you can walk through walls if you know how to do this
- A different use is to cloak or hide something: by exciting its vibrational state, it can appear to be invisible!

The Geometry of the Universe

- The universe locally is a 26 real dimensional symplectic geometry
- The 24 real spatial dimensions and in eight subspaces of three real dimensions or four subspace of three complex dimensions
- The universe is vibrating, and locally is locked into one of the vibrational modes associated with the appropriate sporadic group
- If we increase the vibrational energy, objects can move to other vibrational modes, and become hidden, or can occupy the same volume of space as other nonexcited objects