

# How I Ended Up On One Webpage With Snoop Lion & Another With Pres. Obama

S. James Gates, Jr.

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Ford Foundation Physics Professor  
Affiliate Professor of Mathematics

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<https://www.brown.edu/campus-life/events/thinking-out-loud/gates>



The screen's **FIRST STORY** of  
**SPACE  
ISLANDS**  
in the  
sky!

# SPACEWAYS



**HOWARD DUFF · EVA BARTOK** in **SPACEWAYS**

Produced by MICHAEL CARRERAS · Directed by TERENCE FISHER · Screenplay by PAUL TABOR and RICHARD LANDAU · Story by CHARLES ERIC WAINE  
AN EXCLUSIVE FILMS PRODUCTION · A LIPPETT PICTURES Presentation

TERENCE FISHER'S  
**SPACEWAYS**



**SPACE IS A  
GOLD PLACE  
TO DIE!**

Starring

**HOWARD DUFF**

**EVA BARTOK**

A Hammer Film Production

Who rules the  
**SPACE ISLANDS**  
in the sky...  
rules the  
world!

# SPACEWAYS

**HOWARD DUFF and EVA BARTOK**  
in **"SPACEWAYS"**

Produced by MICHAEL CARRIAS - Directed by TORRICE FISHER  
Screenplay by PAUL TAYOR and RONALD LANGAU  
Story by CHARLES BRUCE WAIN  
An EXCLUSIVE FILMS Production - A LIPPERT PICTURES Presentation

**SHOCK  
CHILLS**

...as  
three-stage  
rocket  
explodes  
into  
space!



**THRILL**

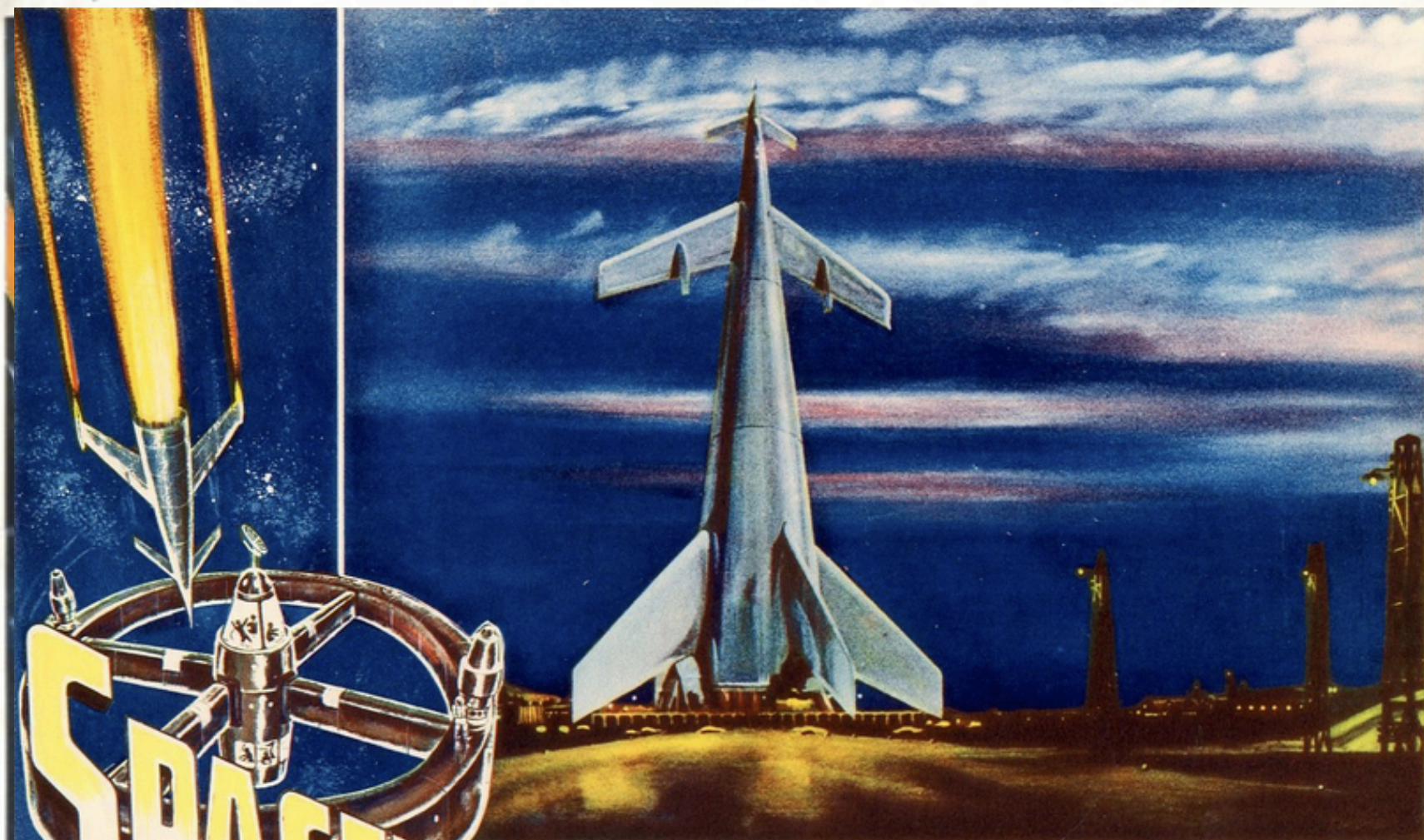
...to  
girl  
stowaway  
on runaway  
rocket  
hurtling  
across  
the  
heavens!



**DARING  
DRAMA**

...of  
rocket  
rescues  
in the  
sub-strata!





# SPACEWAYS

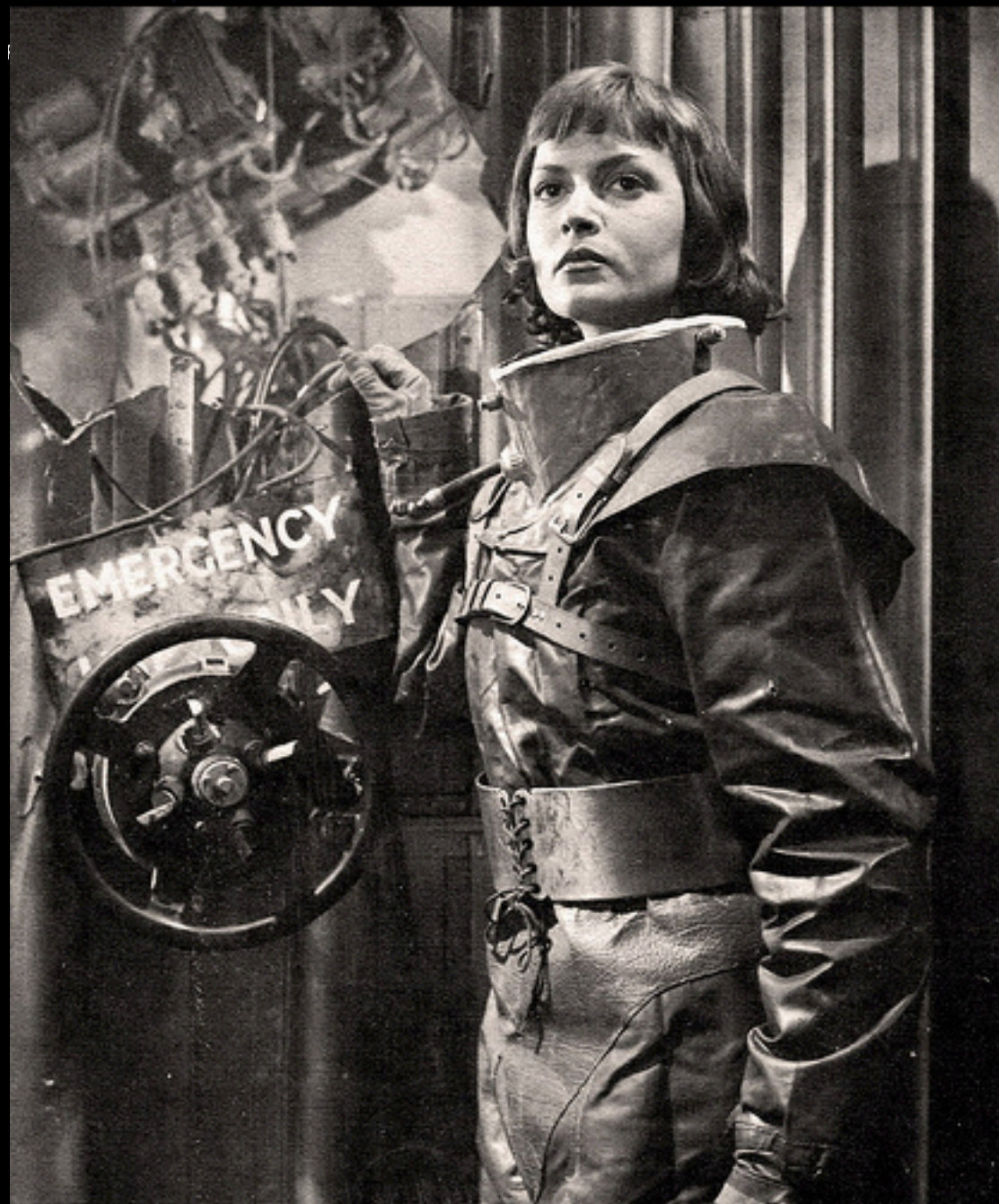
**HOWARD DUFF · EVA BARTOK**  
in **"SPACEWAYS"**

Produced by MICHAEL CARRERAS · Directed by TERENCE FISHER  
Screenplay by PAUL TABORI and RICHARD LANDAU

Adapted from the radio play by CHARLES ERIC MAINE  
An EXCLUSIVE FILMS Production · A LIPPERT PICTURES Presentation





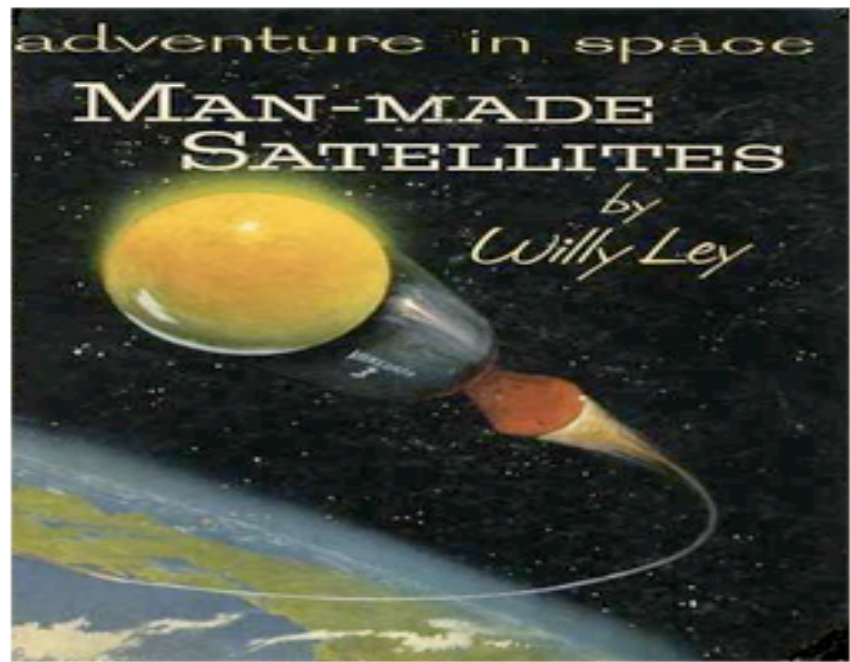


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A YouTube video player interface. The video content shows the word "SPACEWAYS" in a large, bold, italicized, sans-serif font, slanted upwards from left to right. The background is dark. The video player controls at the bottom include a play button, a volume icon, a progress bar showing 0:00:14 / 1:16:20, and icons for closed captions, settings, and full screen.

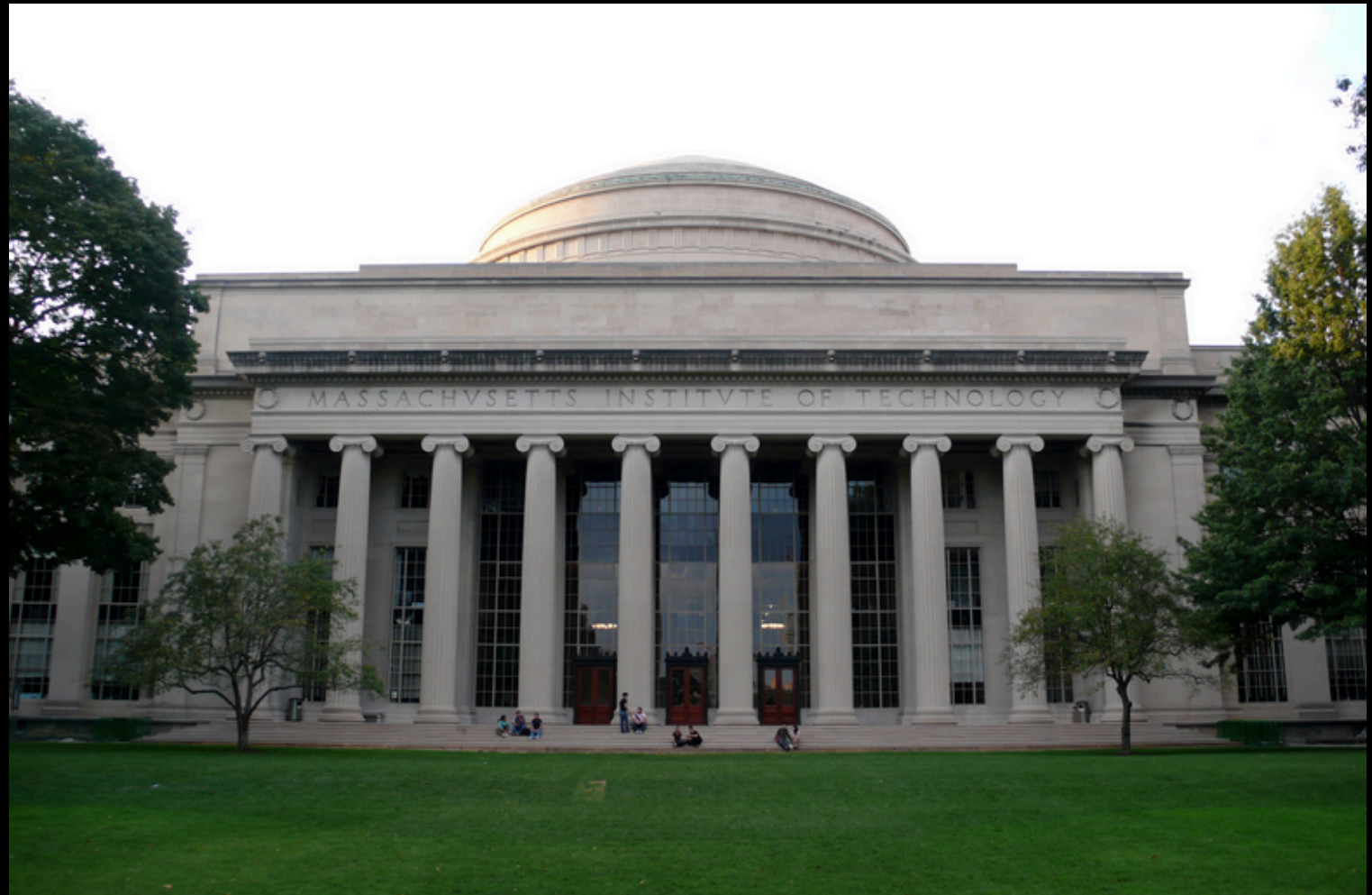
<http://www.youtube.com/watch?v=chb9eDNOJqM>

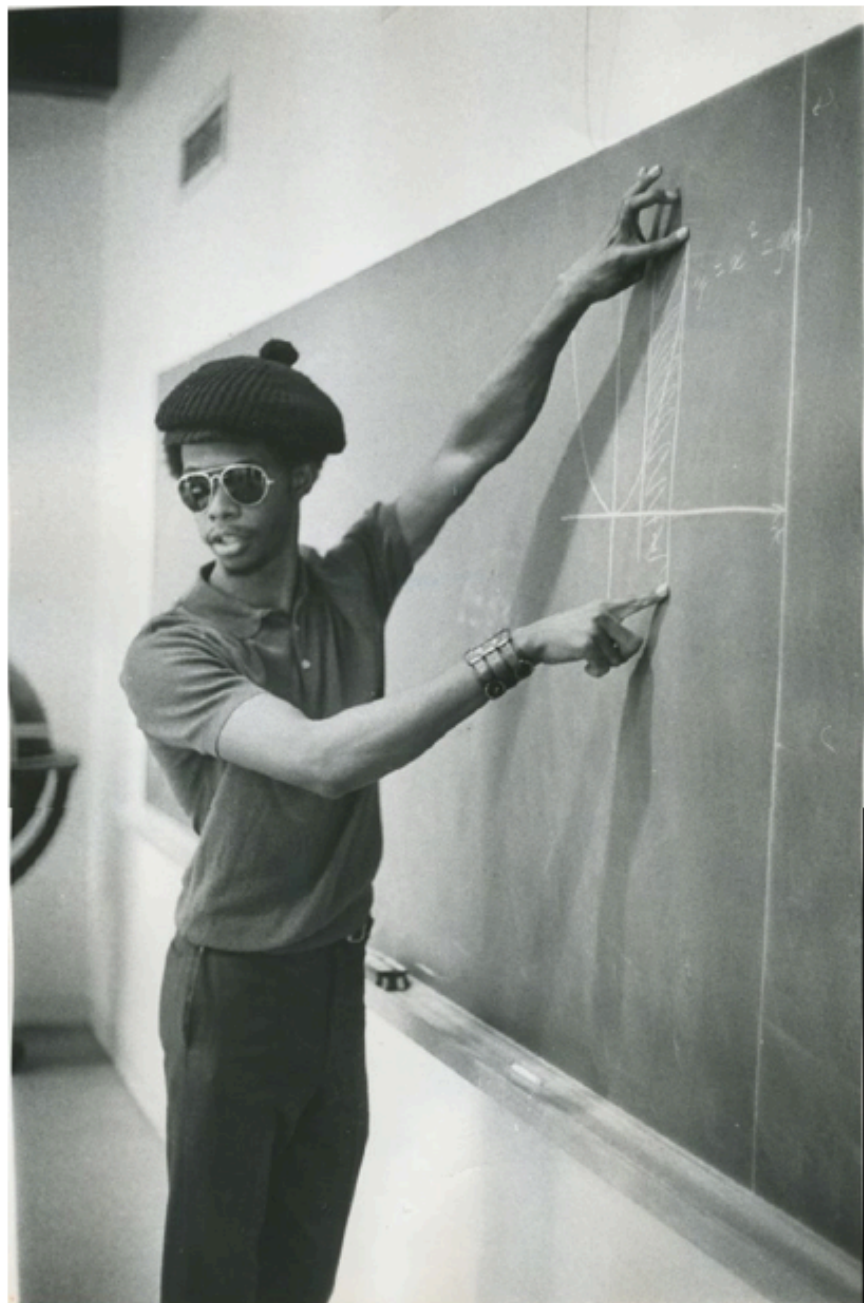












SYMMETRY PRINCIPLES IN SELECTED  
PROBLEMS OF FIELD THEORY

by

SYLVESTER JAMES GATES, JR.

B.S., Massachusetts Institute of Technology  
(June 1973)

B.S., Massachusetts Institute of Technology  
(September 1973)

SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE  
DEGREE OF

DOCTOR OF PHILOSOPHY

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
(June 1977)









## Biographies of Astronaut and Cosmonaut Candidates

### Gates

Sylvester James, Jr. "Jim"

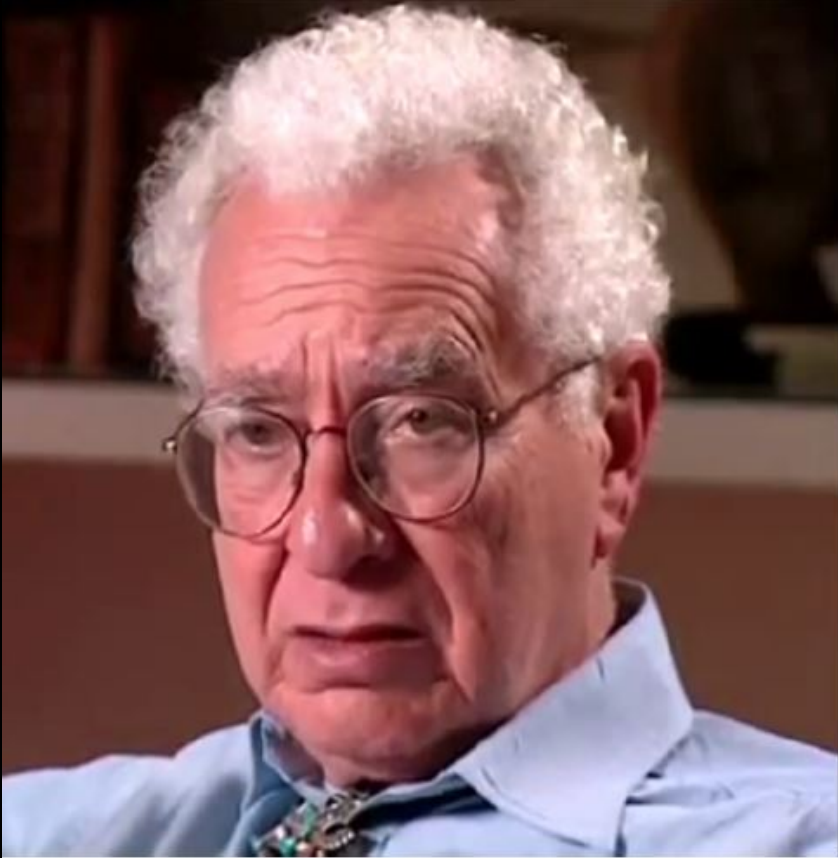
USA



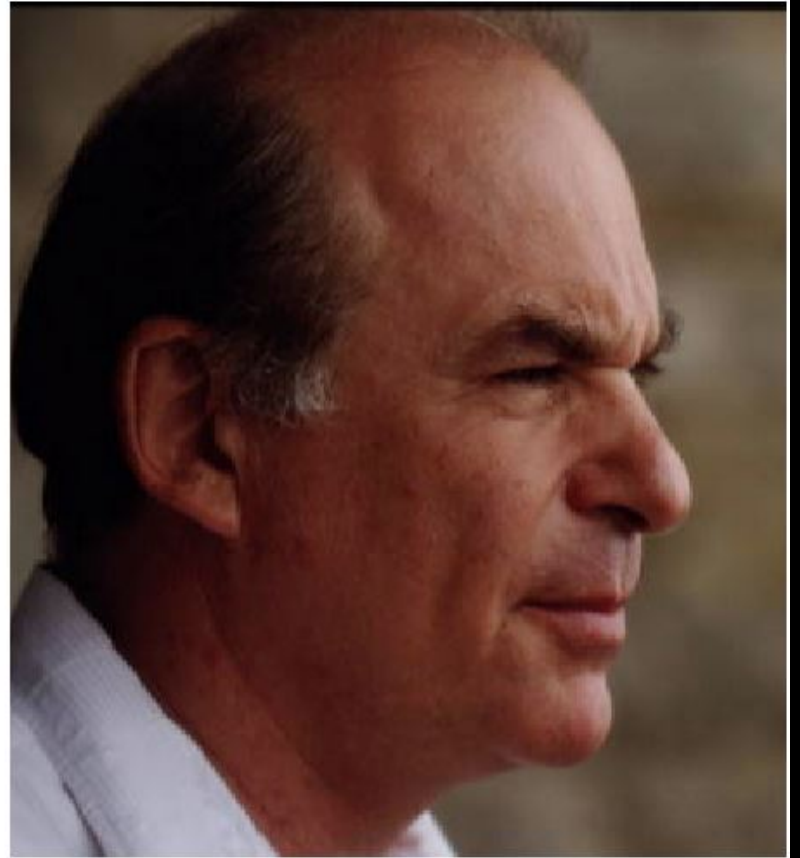
### Personal data

Birthdate:	??.??.1950
Birthplace:	Tampa / Florida
Marital status:	married
Children:	two
Selection date:	??.??.1980
Position:	MSP
Status:	Ret. 29.05.1980





Murray Gell-Mann



John Schwarz





Scientific thought and its creation is  
the common and shared heritage of  
mankind.

— *Abdus Salam* —

A photograph of two men standing in front of a white sign with a blue background. The man on the left has long dark hair, a beard, and is wearing sunglasses and a grey suit jacket over a light blue shirt. The man on the right has a mustache, glasses, and is wearing a dark suit jacket, a white shirt, and a striped tie. The sign behind them features the LIGO logo and text.

# LIGO

Livingston  
Observatory

*A Collaboration of*  
California Institute  
of Technology  
Massachusetts Institute  
of Technology

*Operated for*  
National Science Foundation

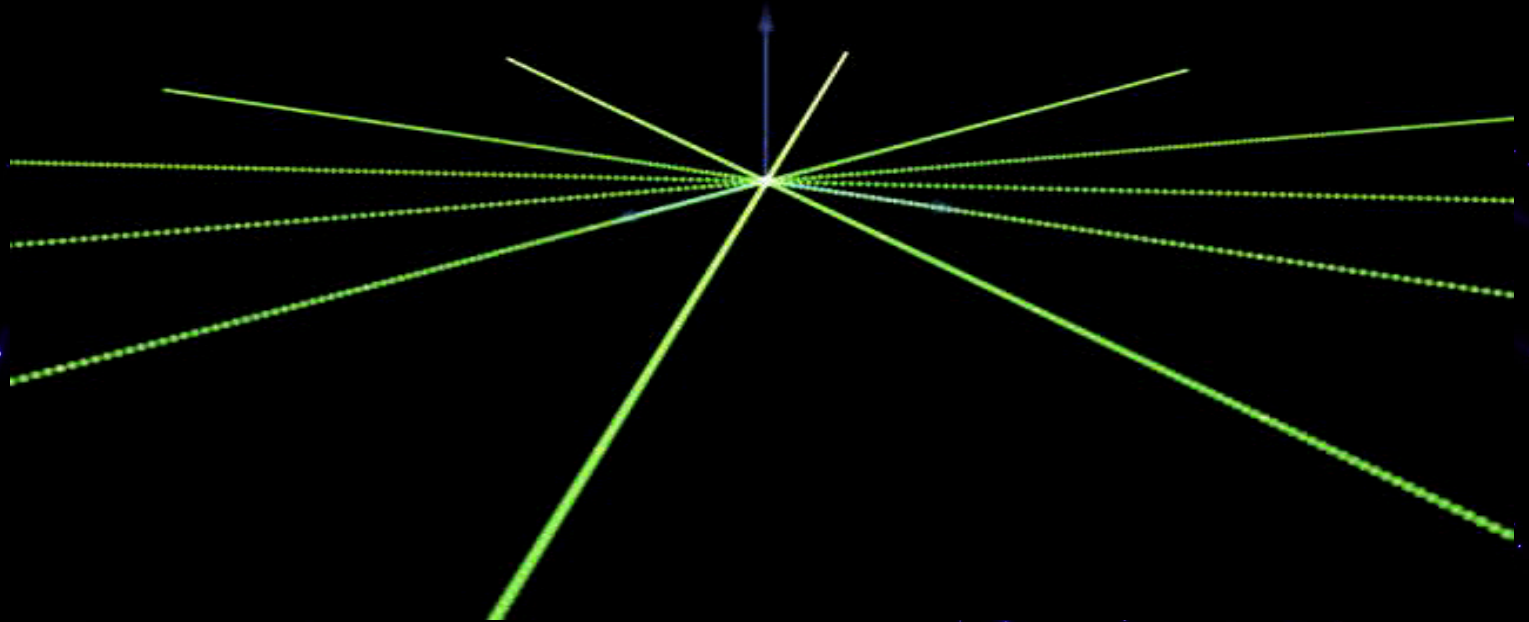
# Maxwell's Equations and Conservation Law

(Beeper/Cell Phone Equations)

$$\vec{\nabla} \cdot \vec{D} = 4\pi\rho \quad , \quad \vec{\nabla} \cdot \vec{B} = 0 \quad ,$$
$$\vec{\nabla} \times \vec{H} - \frac{1}{c} \frac{\partial \vec{D}}{\partial t} = \frac{4\pi}{c} \vec{J} \quad , \quad \vec{\nabla} \times \vec{E} + \frac{1}{c} \frac{\partial \vec{B}}{\partial t} = 0$$

$$\frac{\partial \rho}{\partial t} + \vec{\nabla} \cdot \vec{J} = 0 \quad .$$

ELECTRIC FIELD OF AN OSCILLATING CHARGE





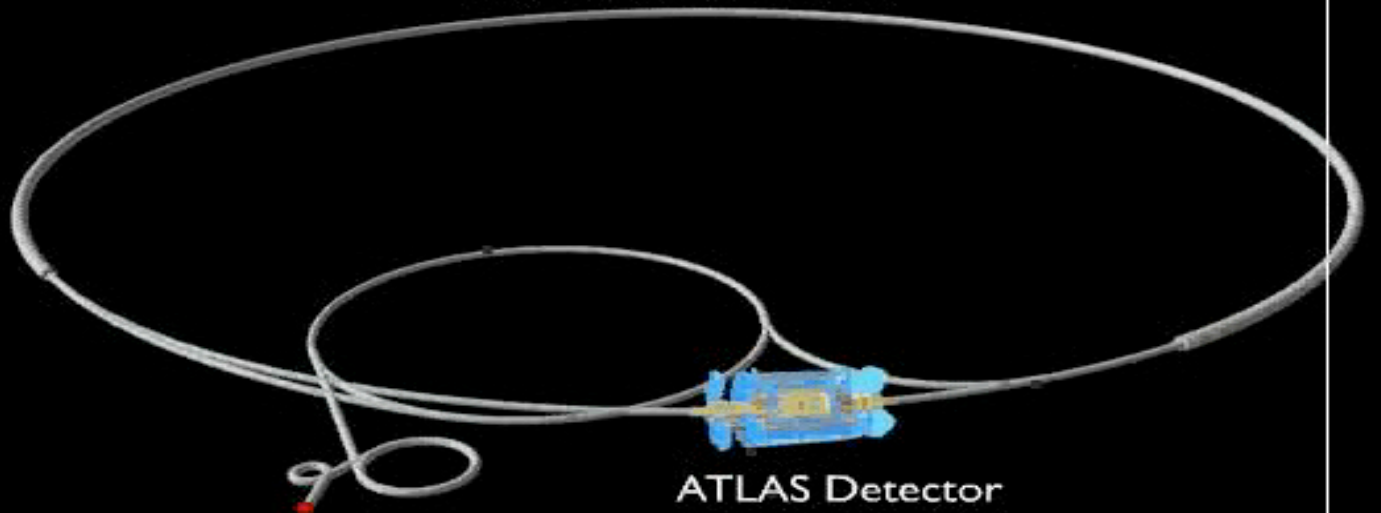


$10^{\frac{00}{m}}$



10<sup>00</sup><sub>m</sub>

Large Hadron Collider



ATLAS Detector

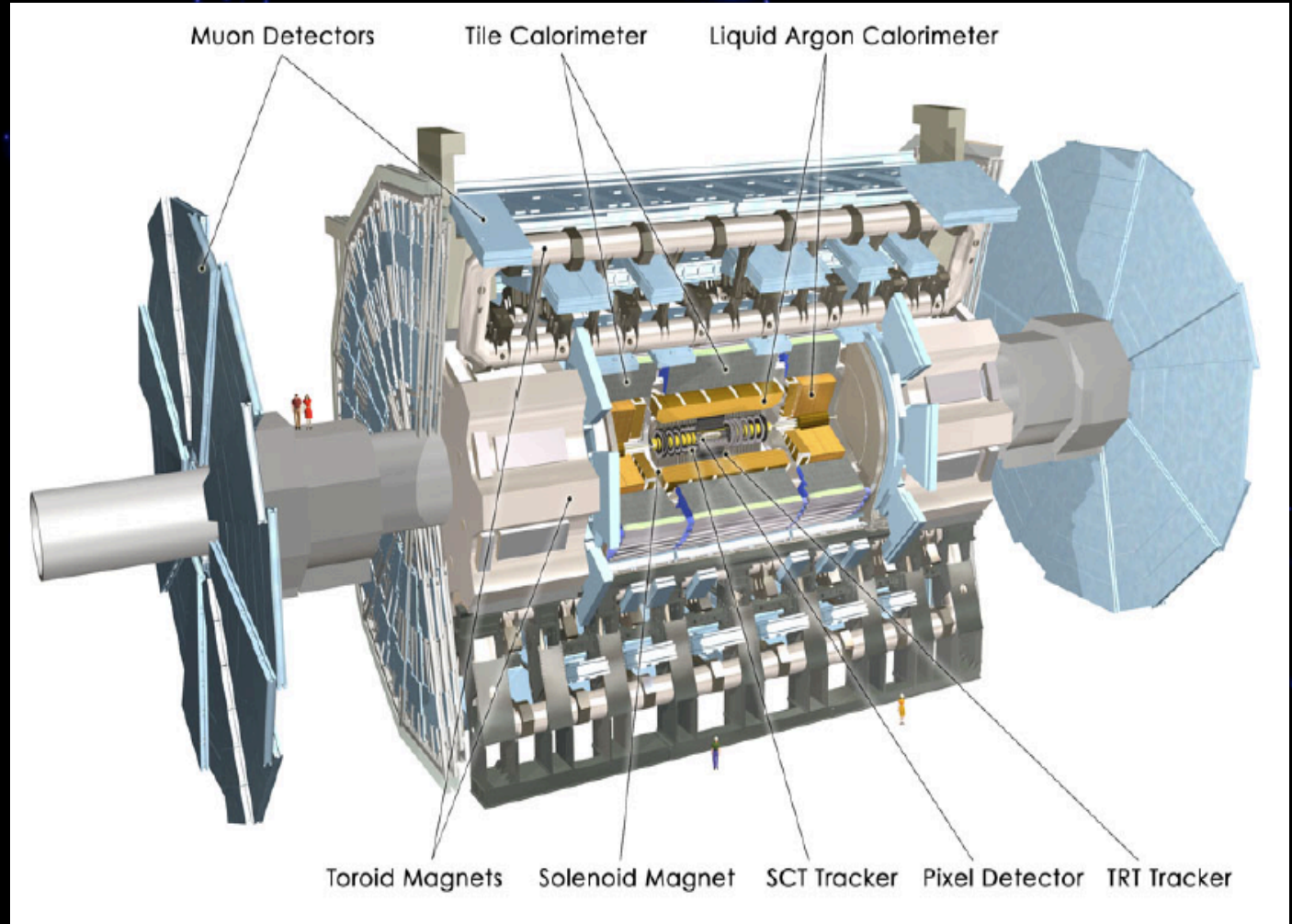


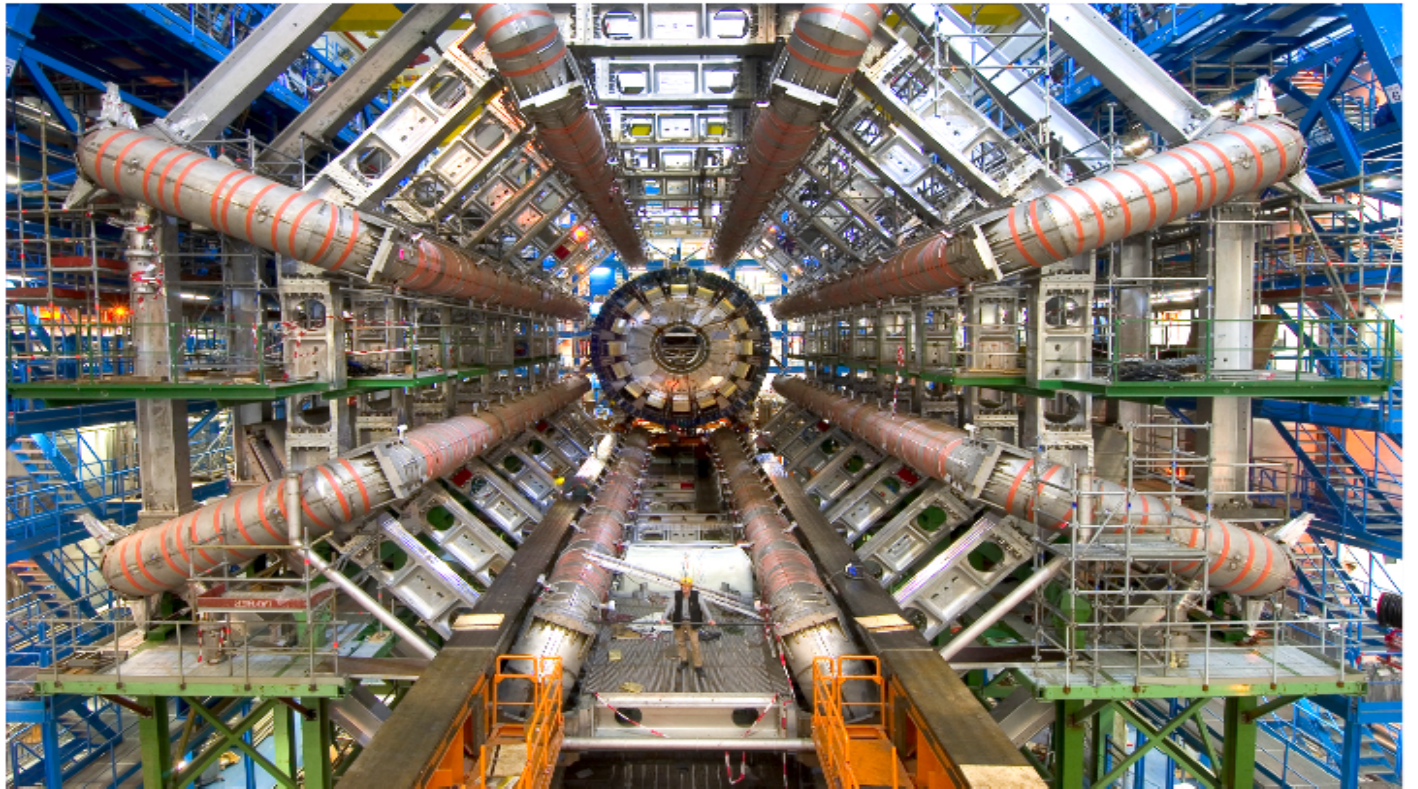
**FRANCE**

**SWITZERLAND**

# ATLAS

## Detector (A Toroidal LHC ApparatuS)

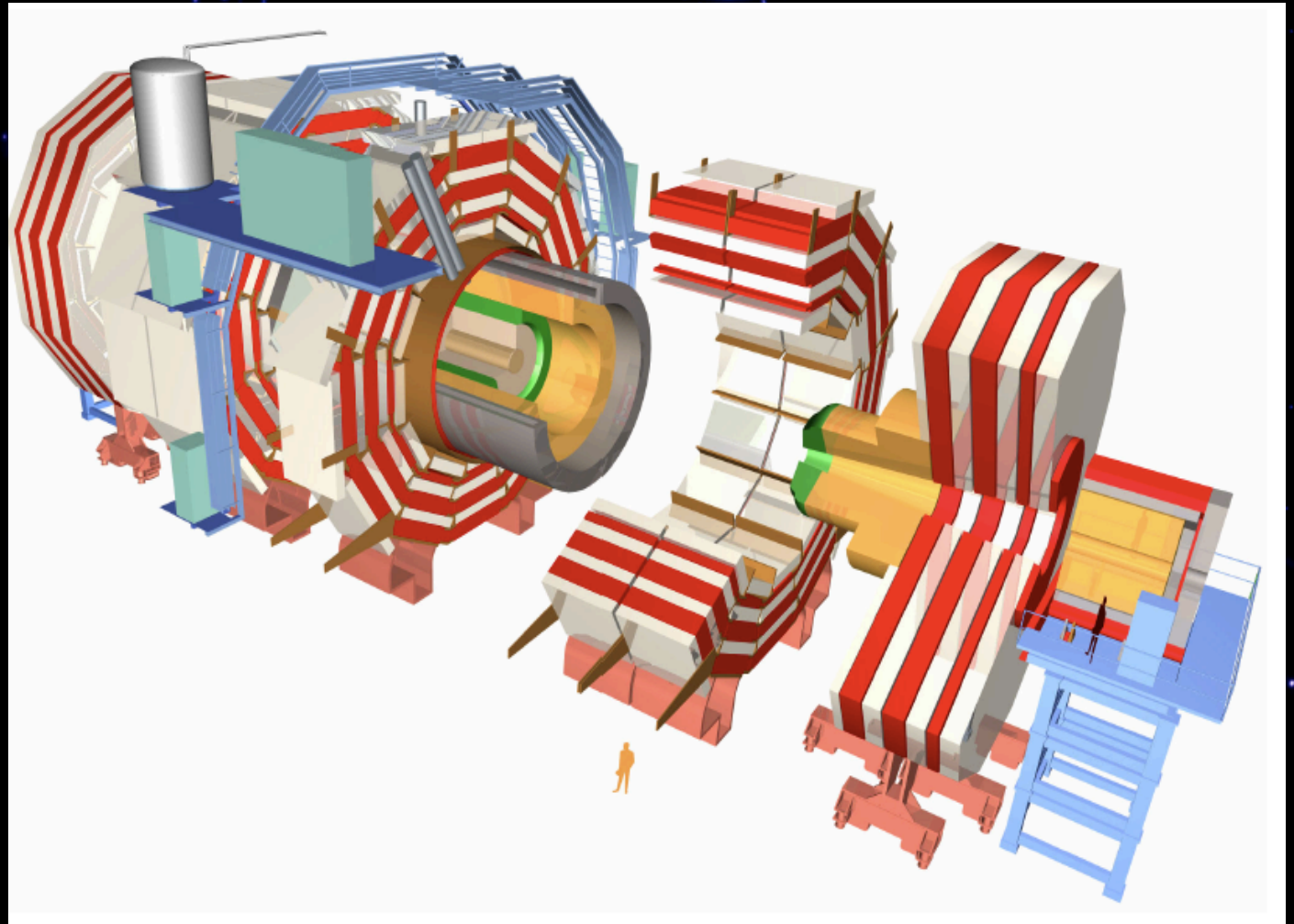


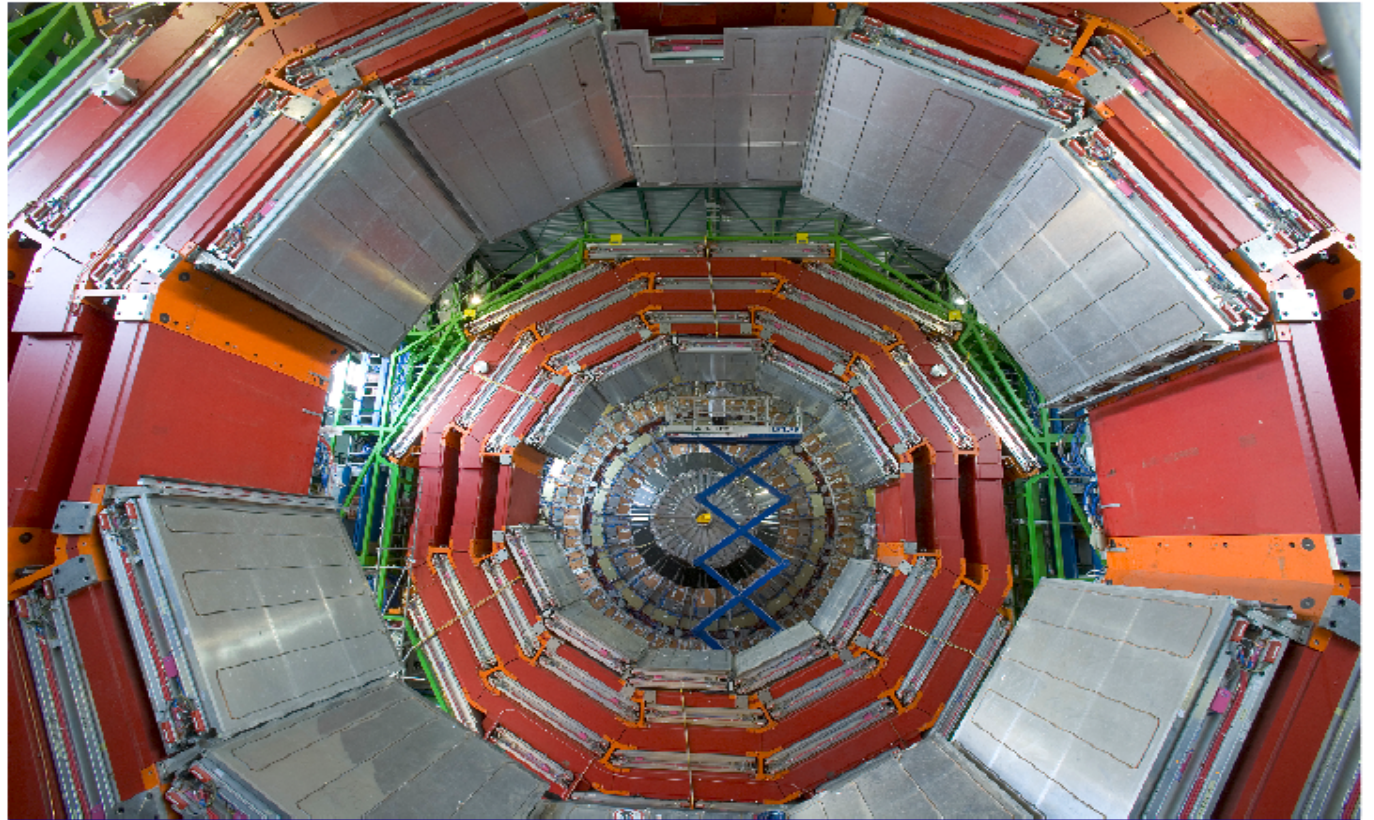


**ATLAS**

CMS

Detector (**C**ompact **M**uon **S**olenoid)



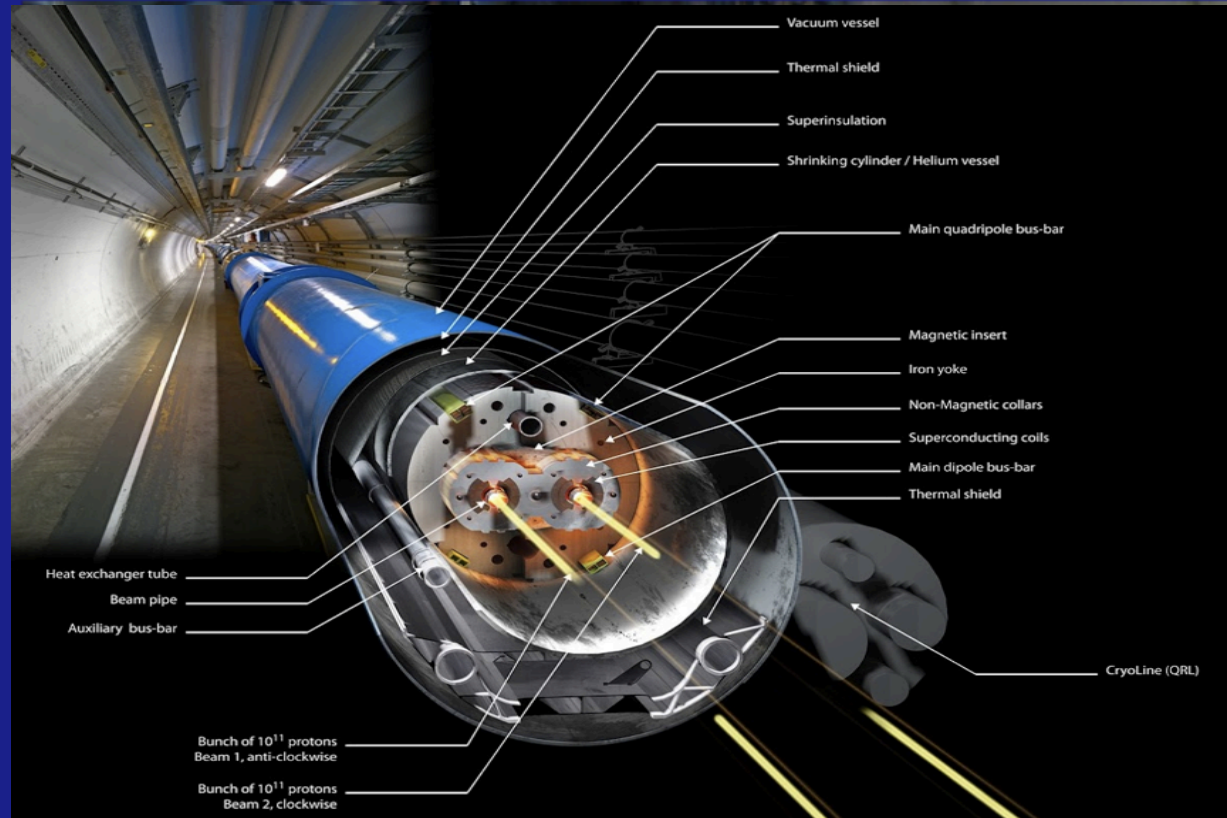


**CMS**

*Photo: Fred Ullrich, Fermilab*



# Overview of LHC Higgs Production Factory



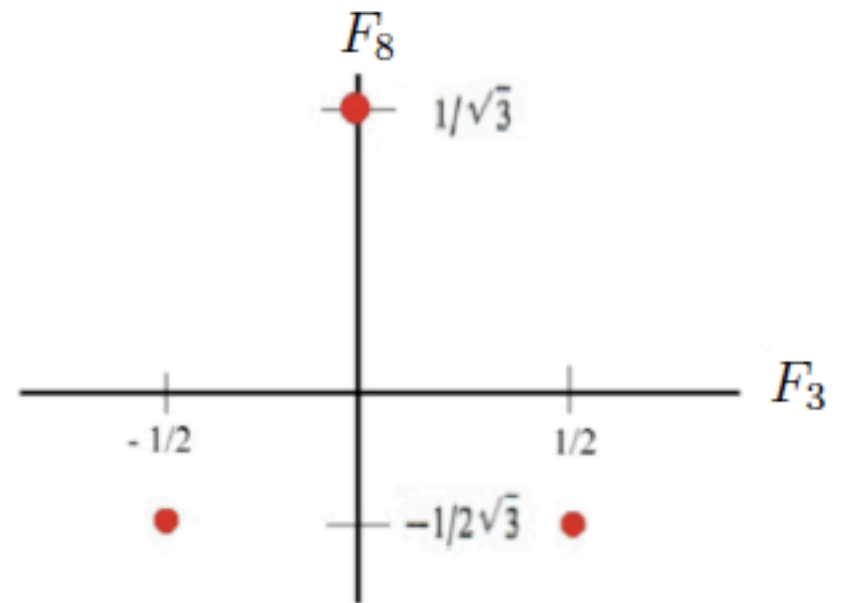
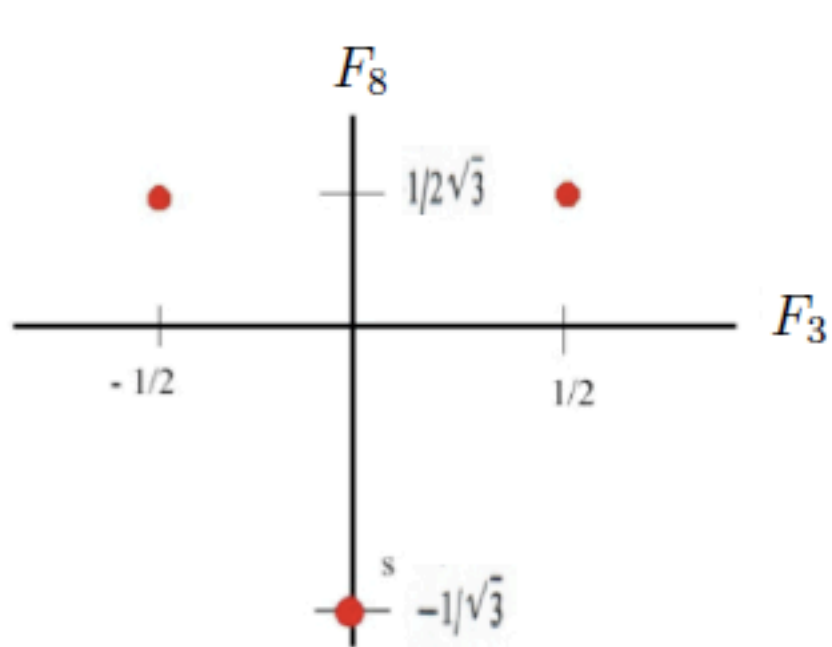


# Baryons $qqq$ and Antibaryons $\bar{q}\bar{q}\bar{q}$

Baryons are fermionic hadrons.

These are a few of the many types of baryons.

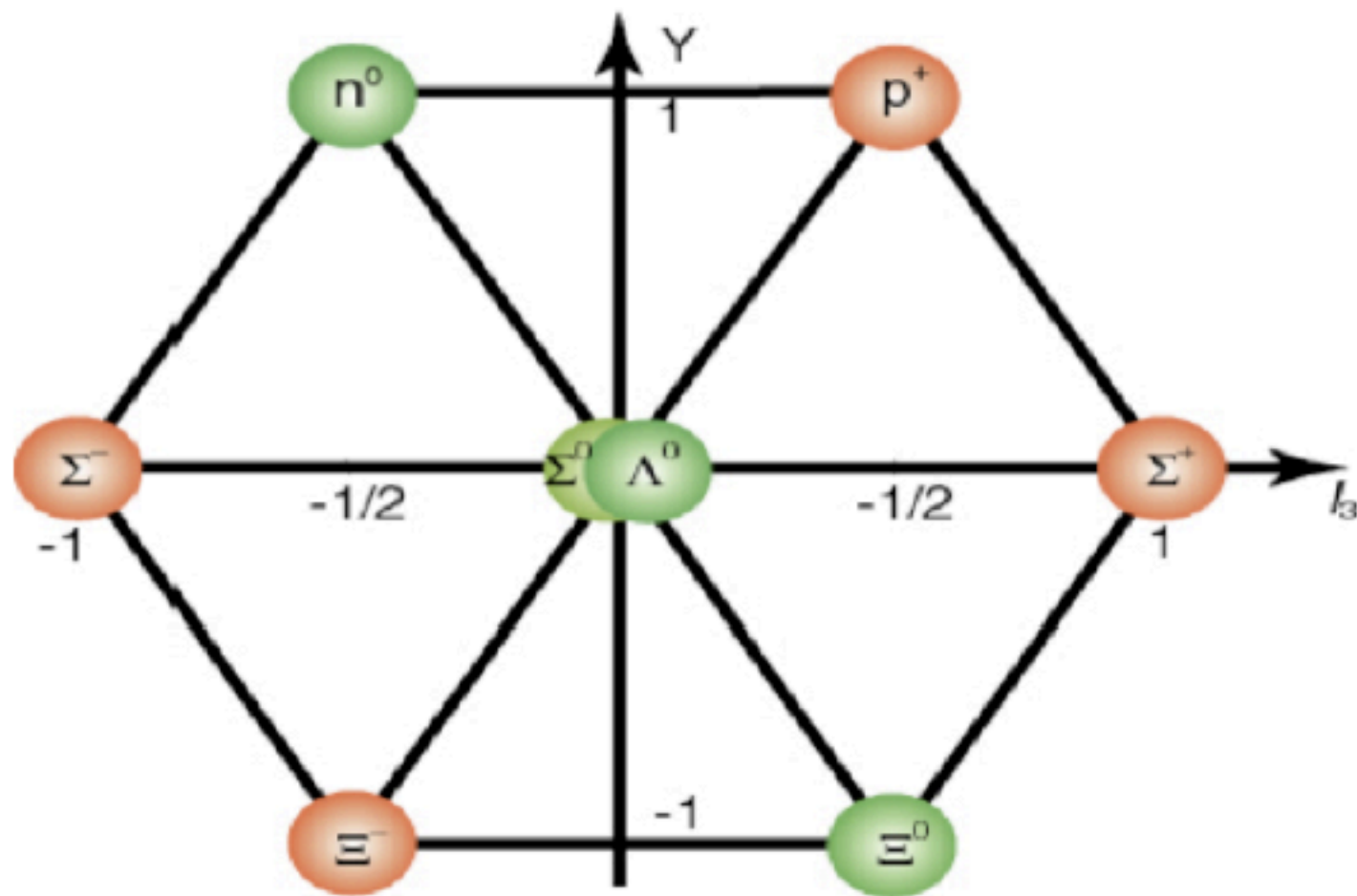
Symbol	Name	Quark content	Electric charge	Mass $\text{GeV}/c^2$	Spin
<b>p</b>	proton	<b>uud</b>	1	0.938	1/2
<b><math>\bar{p}</math></b>	antiproton	<b><math>\bar{u}\bar{u}\bar{d}</math></b>	-1	0.938	1/2
<b>n</b>	neutron	<b>udd</b>	0	0.940	1/2
<b><math>\Lambda</math></b>	lambda	<b>uds</b>	0	1.116	1/2
<b><math>\Omega^-</math></b>	omega	<b>sss</b>	-1	1.672	3/2



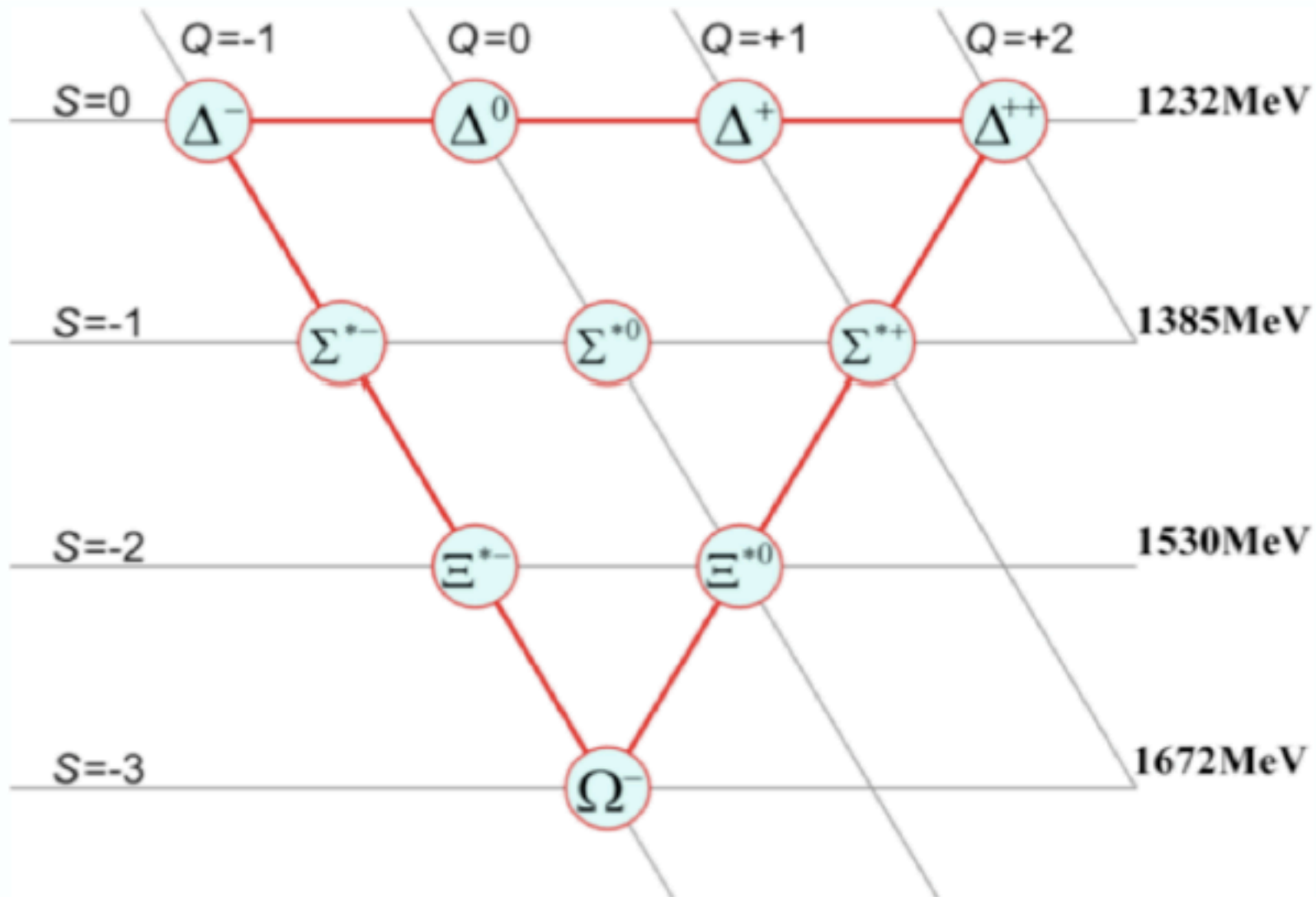
$$p = 1, \quad q = 0$$

$$p = 0, \quad q = 1$$

$$p = 1, \quad q = 1$$



$$p = 3, \quad q = 0$$



# SU(3) Young Tableaux & The integers $p$ and $q$

1	•	•	•	$q$	1	•	•	•	$p$
1	•	•	•	$q$					

# Counting Representations

$$d_{SU(2)} = (2j + 1)$$

$$d_{SU(3)} = \frac{1}{2}(p + 1)(q + 1)(p + q + 2)$$

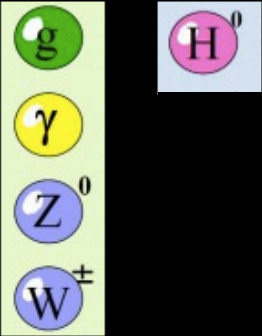
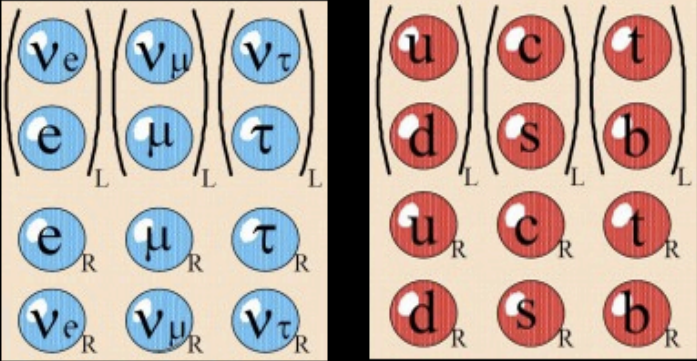
*Weyl* discovered that for the simple Lie algebras the dimension of a representation  $\Gamma(w^h)$  labeled by the highest weight  $w^h$  is given the formula

$$\dim \Gamma(w^h) = \prod_{\mu > 0} [\mu \cdot (w^h + \mu^+ / 2)] / [\mu \cdot (\mu^+ / 2)].$$

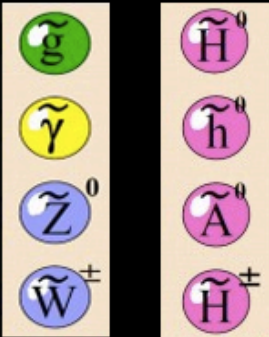
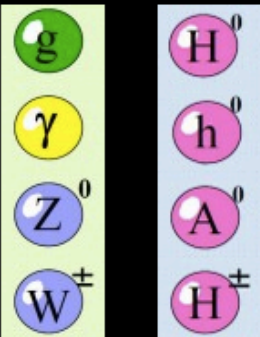
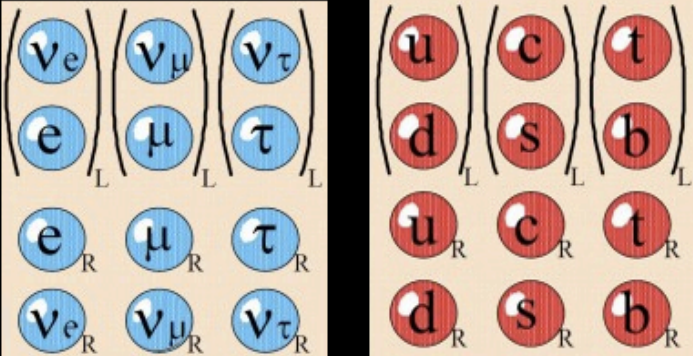
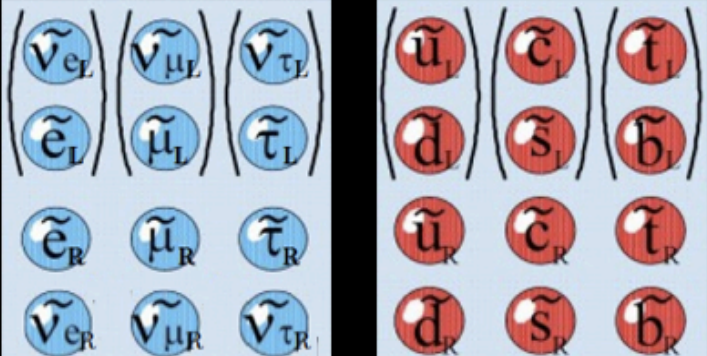
Here the product is to be taken over all *positive* root vectors and  $\mu^+$  is the sum of all positive roots



# From SM to MSSM

	FERMION	BOSON
ENERGY		
MATTER		

# From SM to MSSM

	FERMION	BOSON
ENERGY		
MATTER		

## 4D Chiral Supermultiplet ( $A, B, \psi_a, F, G$ )

$$D_a A = \psi_a \ ,$$

$$D_a B = i (\gamma^5)_a{}^b \psi_b \ ,$$

$$D_a \psi_b = i (\gamma^\mu)_{ab} \partial_\mu A - (\gamma^5 \gamma^\mu)_{ab} \partial_\mu B - i C_{ab} F + (\gamma^5)_{ab} G \ ,$$

$$D_a F = (\gamma^\mu)_a{}^b \partial_\mu \psi_b \ ,$$

$$D_a G = i (\gamma^5 \gamma^\mu)_a{}^b \partial_\mu \psi_b \ .$$

## 4D Vector Supermultiplet ( $A_\mu, \lambda_a, d$ )

$$D_a A_\mu = (\gamma_\mu)_a{}^b \lambda_b \ ,$$

$$D_a \lambda_b = -i \frac{1}{4} ([\gamma^\mu, \gamma^\nu])_{ab} (\partial_\mu A_\nu - \partial_\nu A_\mu) + (\gamma^5)_{ab} d \ ,$$

$$D_a d = i (\gamma^5 \gamma^\mu)_a{}^b \partial_\mu \lambda_b \ .$$

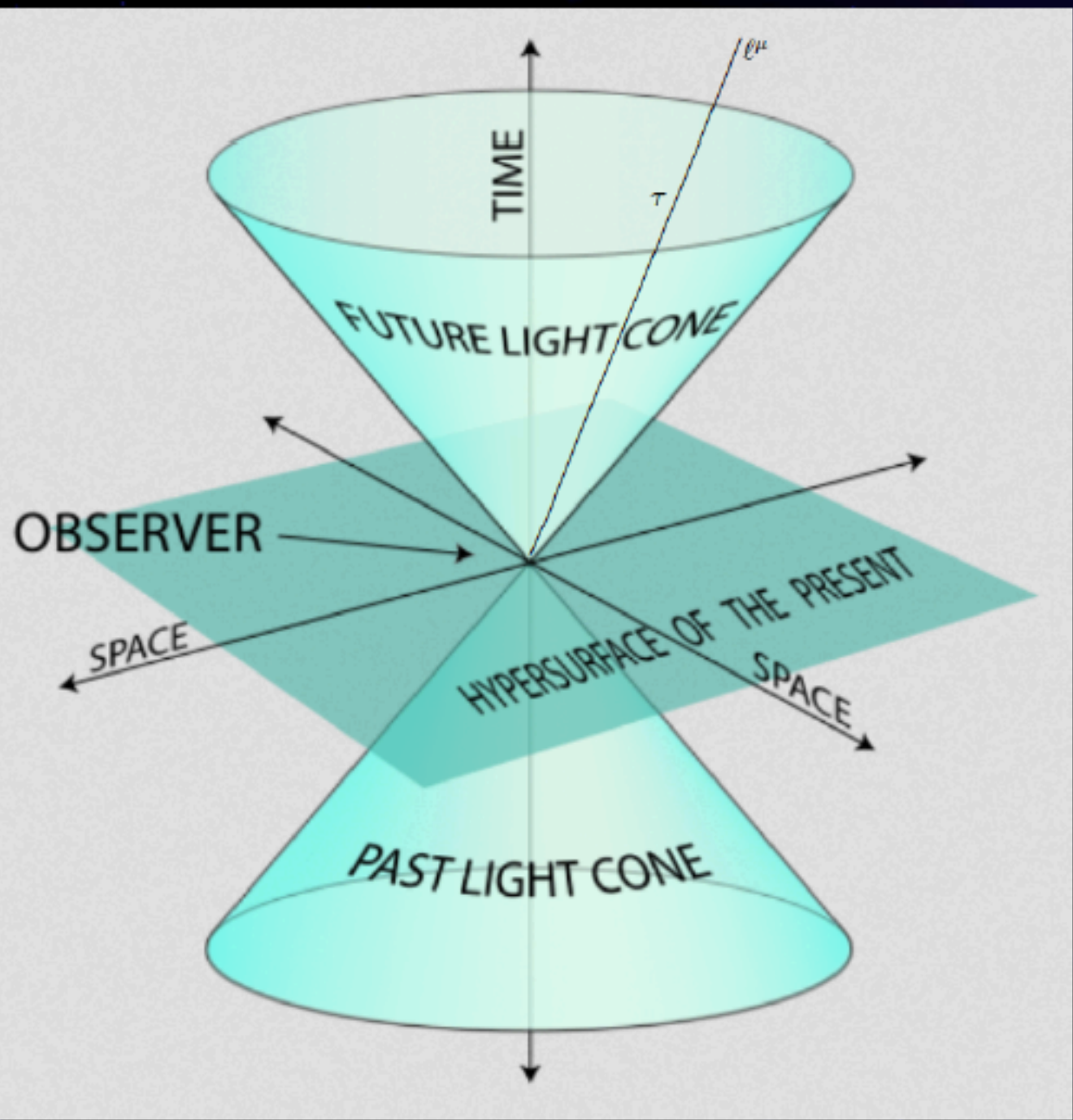
# 4D Tensor Supermultiplet

$(\varphi, B_{\mu\nu}, \chi_a)$

$$D_a \varphi = \chi_a \quad ,$$

$$D_a B_{\mu\nu} = -\frac{1}{4}([\gamma_\mu, \gamma_\nu])_a{}^b \chi_b \quad ,$$

$$D_a \chi_b = i(\gamma^\mu)_{ab} \partial_\mu \varphi - (\gamma^5 \gamma^\mu)_{ab} \epsilon_{\mu}{}^{\rho\sigma\tau} \partial_\rho B_{\sigma\tau} \quad .$$

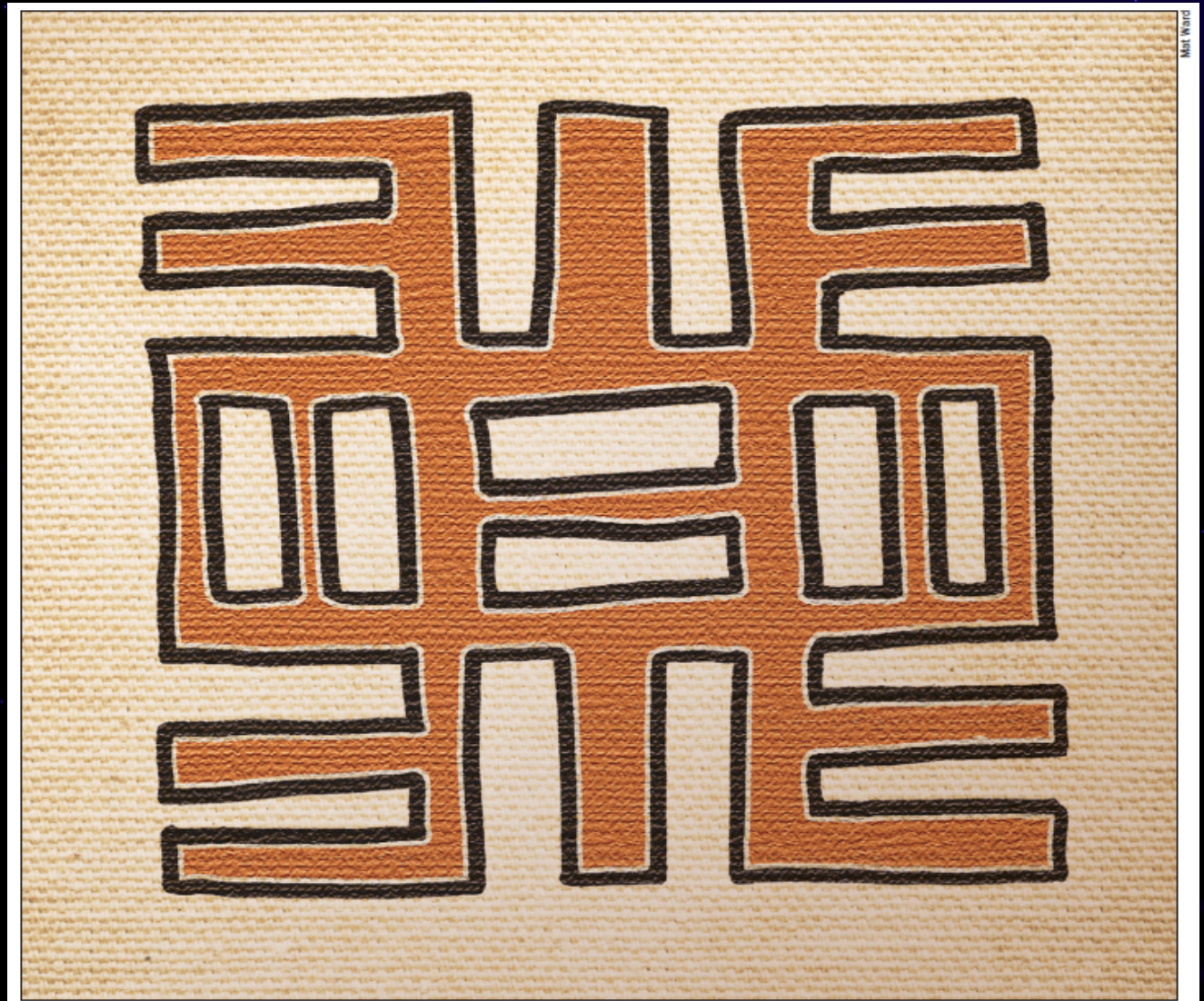


$$(L_I)_{i^{\hat{j}}} (R_J)_{\hat{j}^k} + (L_J)_{i^{\hat{j}}} (R_I)_{\hat{j}^k} = 0 \quad \text{where } I \neq J \quad .$$

$$(R_J)_{\hat{i}^j} (L_I)_{j^{\hat{k}}} + (R_I)_{\hat{i}^j} (L_J)_{j^{\hat{k}}} = 0 \quad \text{where } I \neq J \quad .$$

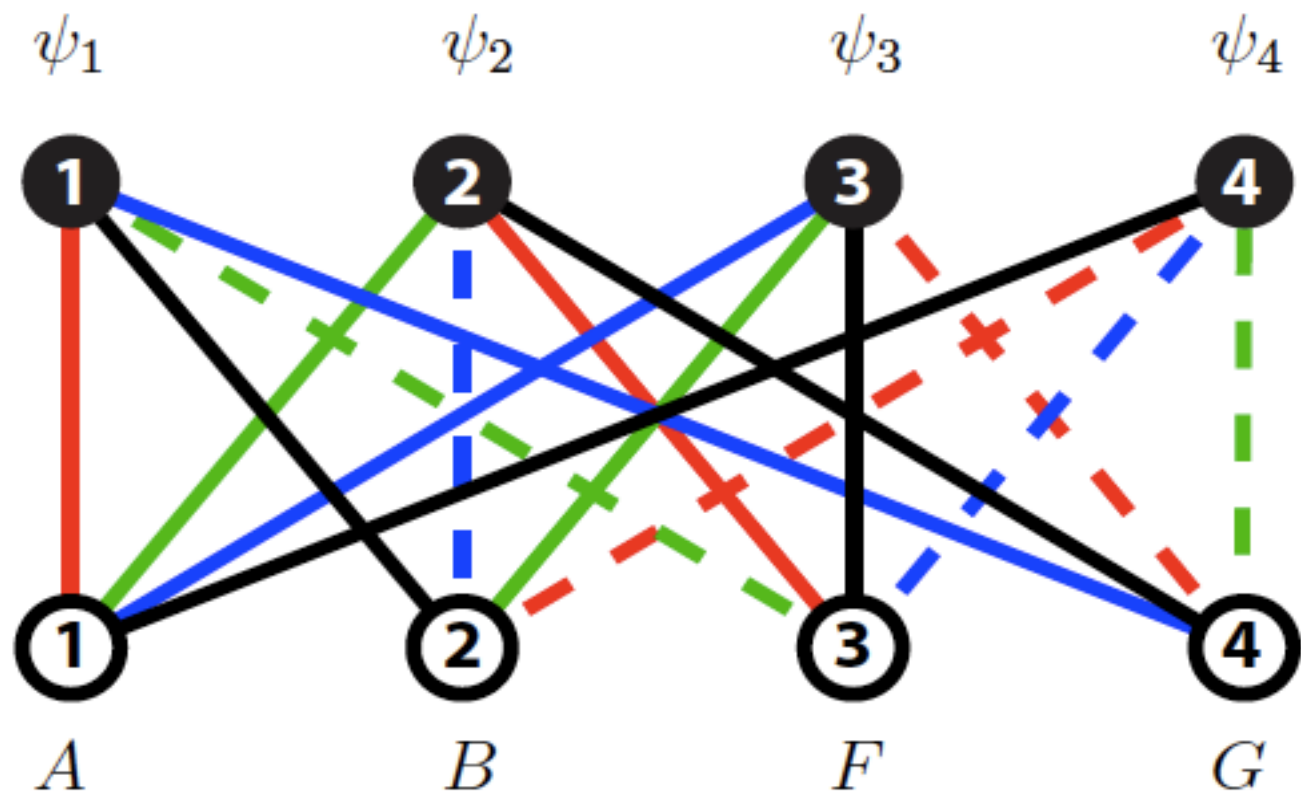
$$(L_I)_{i^{\hat{j}}} (R_J)_{\hat{j}^k} = \delta_i^k \quad \text{where } I = J \quad .$$

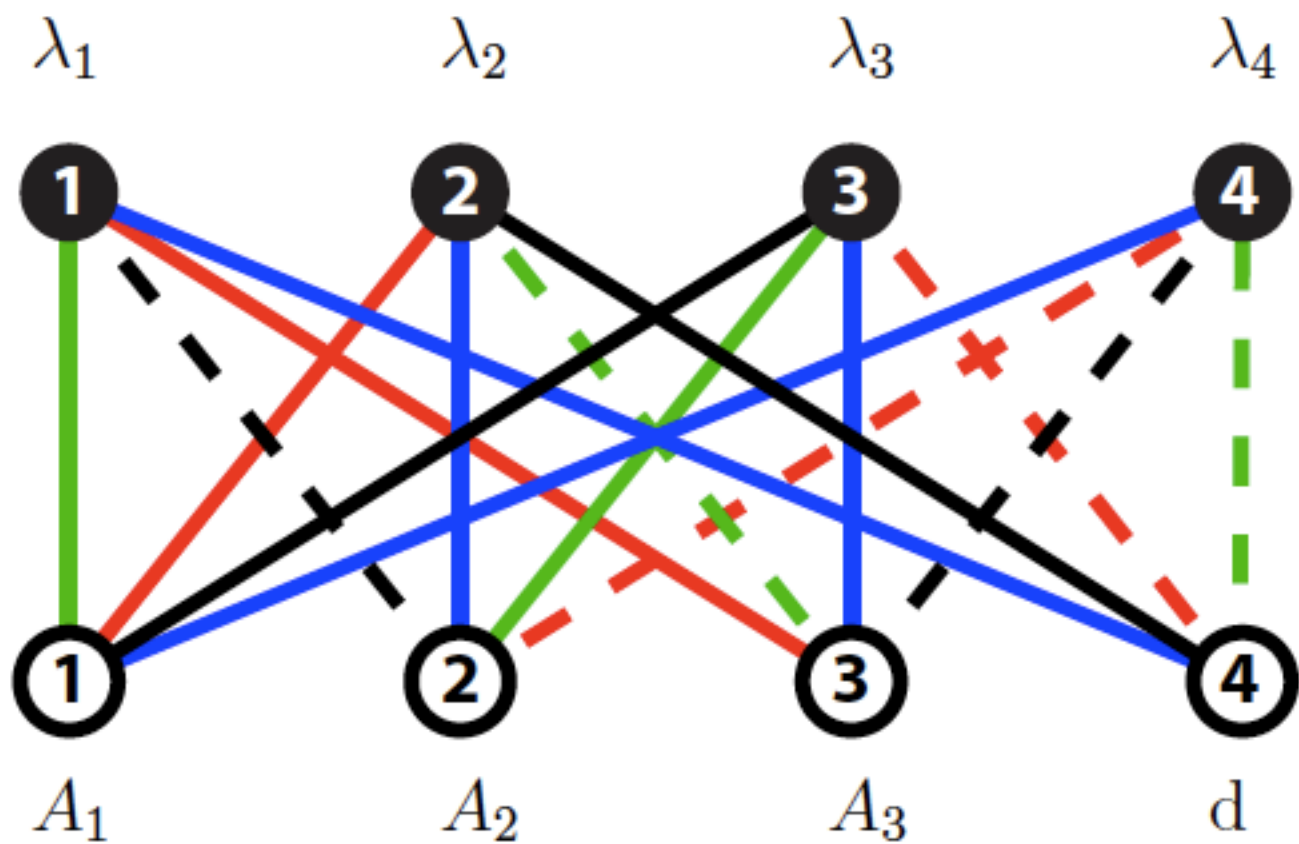
$$(R_J)_{\hat{i}^j} (L_I)_{j^{\hat{k}}} = \delta_{\hat{i}}^{\hat{k}} \quad \text{where } I = J \quad .$$

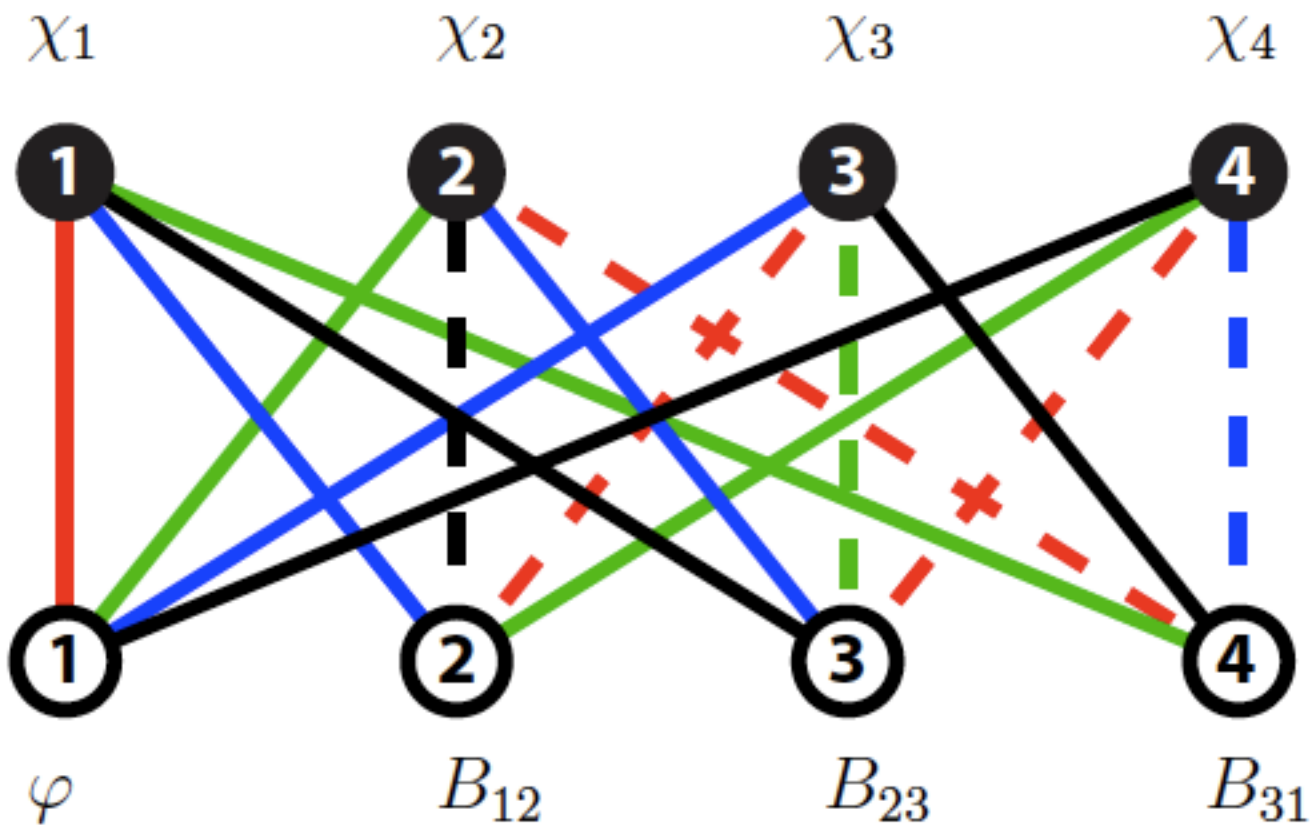


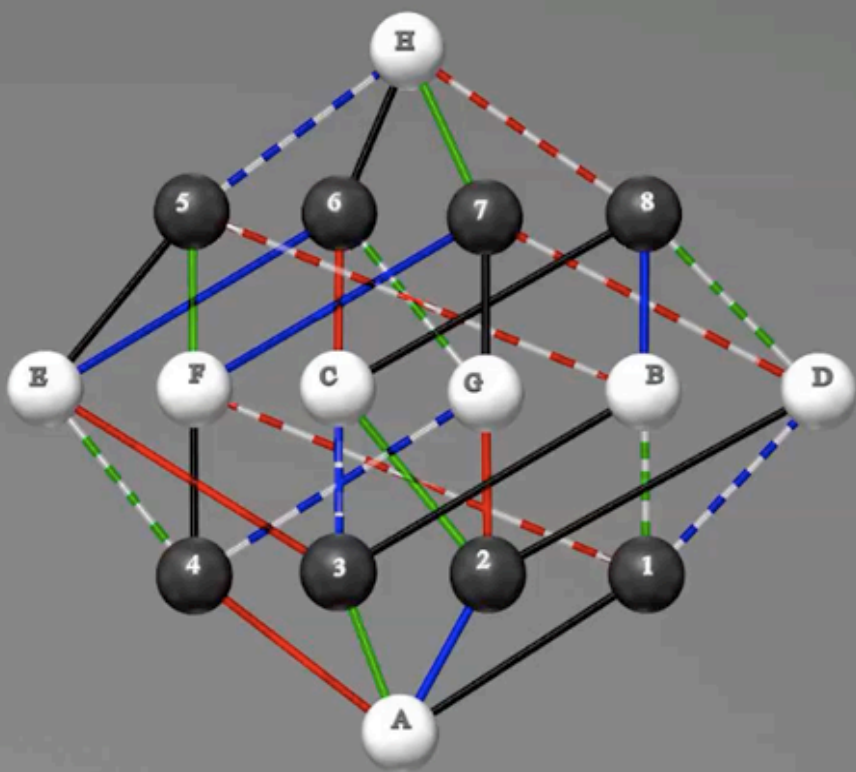
A traditional west African Adinkra called “neo onnim no sua a ohu” which translates as “he who does not know, can become knowledgeable through learning.”

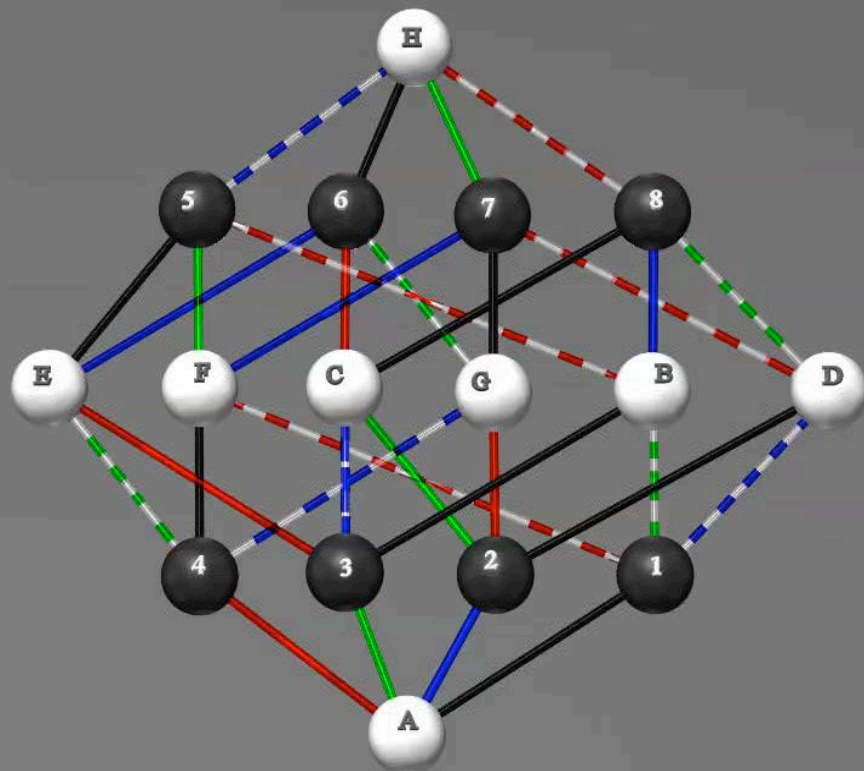


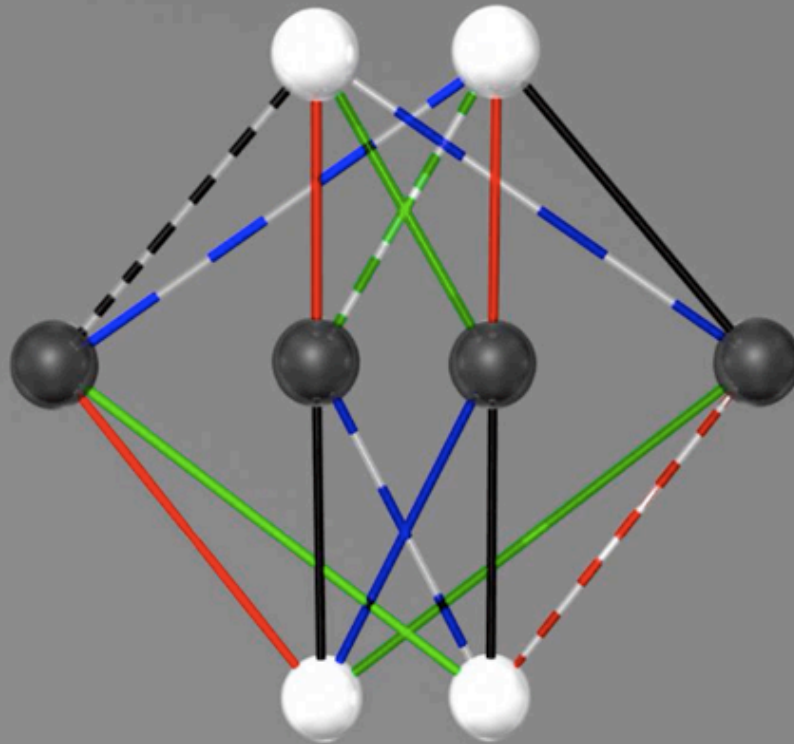


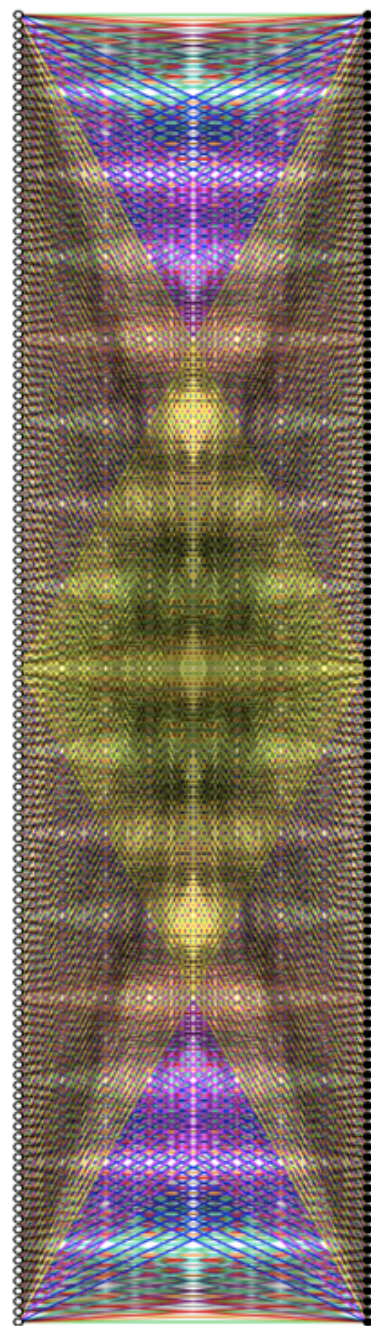
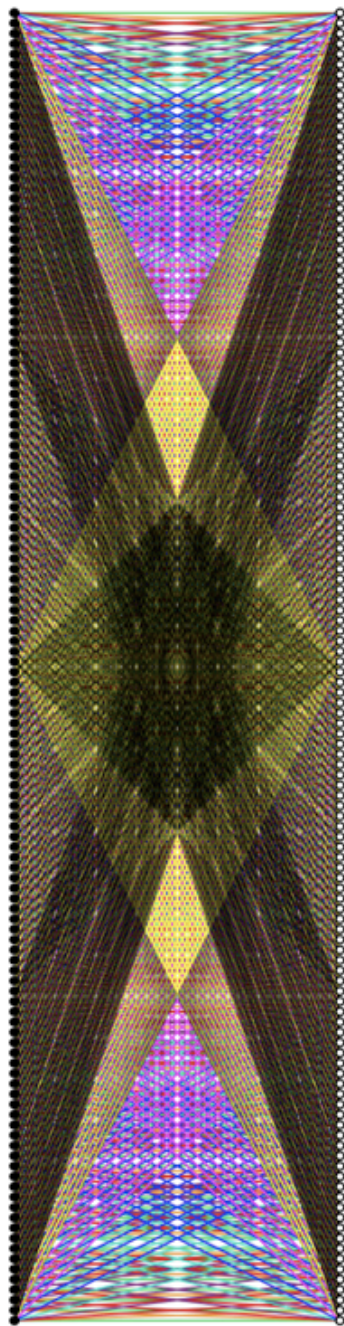


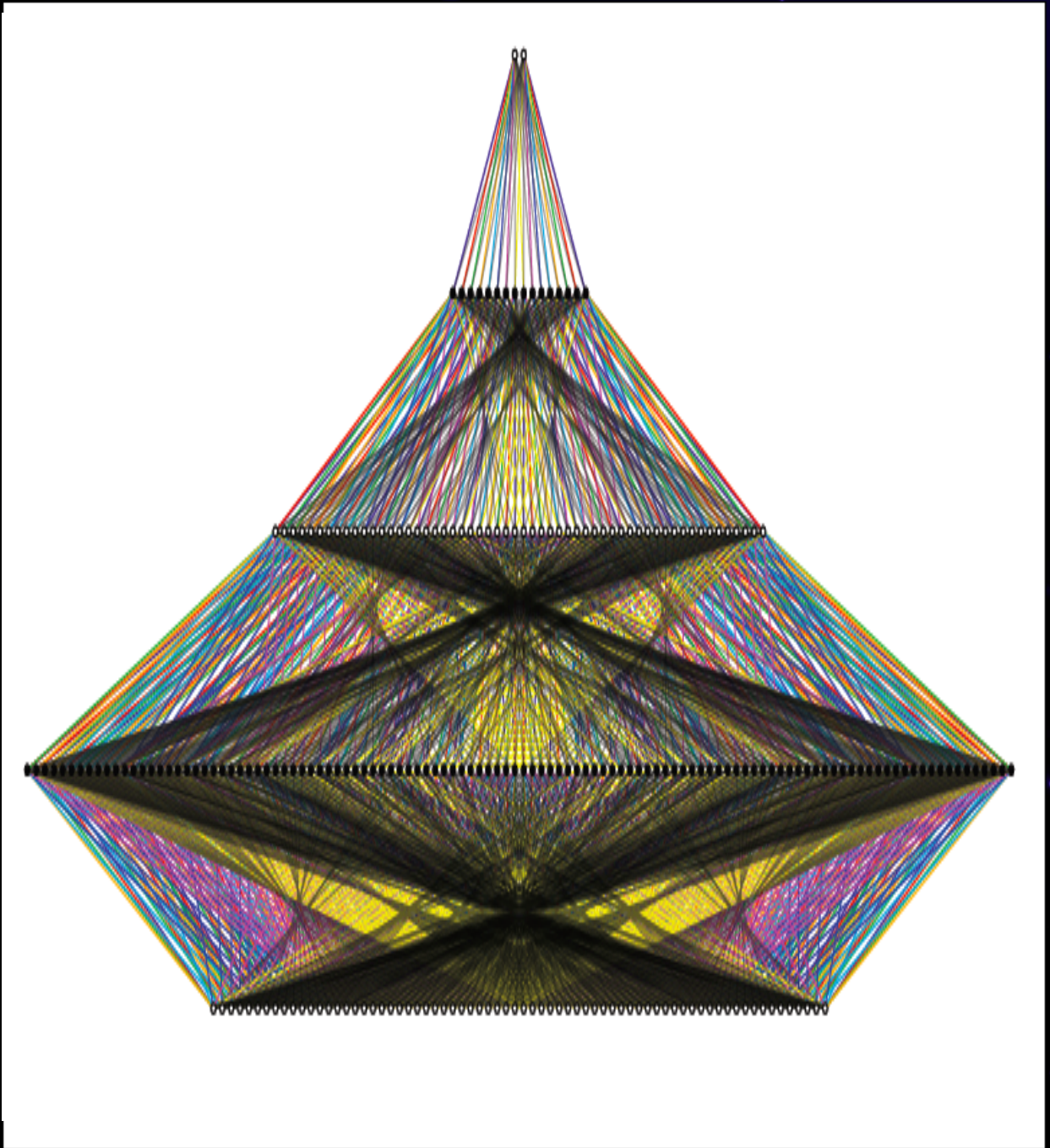














**Adinkras From Ordered Quartets of  
BC<sub>4</sub> Coxeter Group Elements and Regarding  
Another Gadget's 1,358,954,496 Matrix Elements**

S. James Gates, Jr.,<sup>1a</sup> Lucas Kang,<sup>2a</sup> David S. Kessler,<sup>3b</sup> and Vadim Korotkikh<sup>4c</sup>

<sup>a</sup>*Department of Physics, Brown University,  
Box 1843, 182 Hope Street, Barus & Holley 545, Providence, RI 02912, USA*






<sup>b</sup>*Amherst Center for Fundamental Interactions, Department of Physics,  
University of Massachusetts, Amherst, MA 01003, USA*

*and*

<sup>c</sup>*Department of Physics, University of Maryland,  
4150 Campus Dr., College Park, MD 20472, USA*

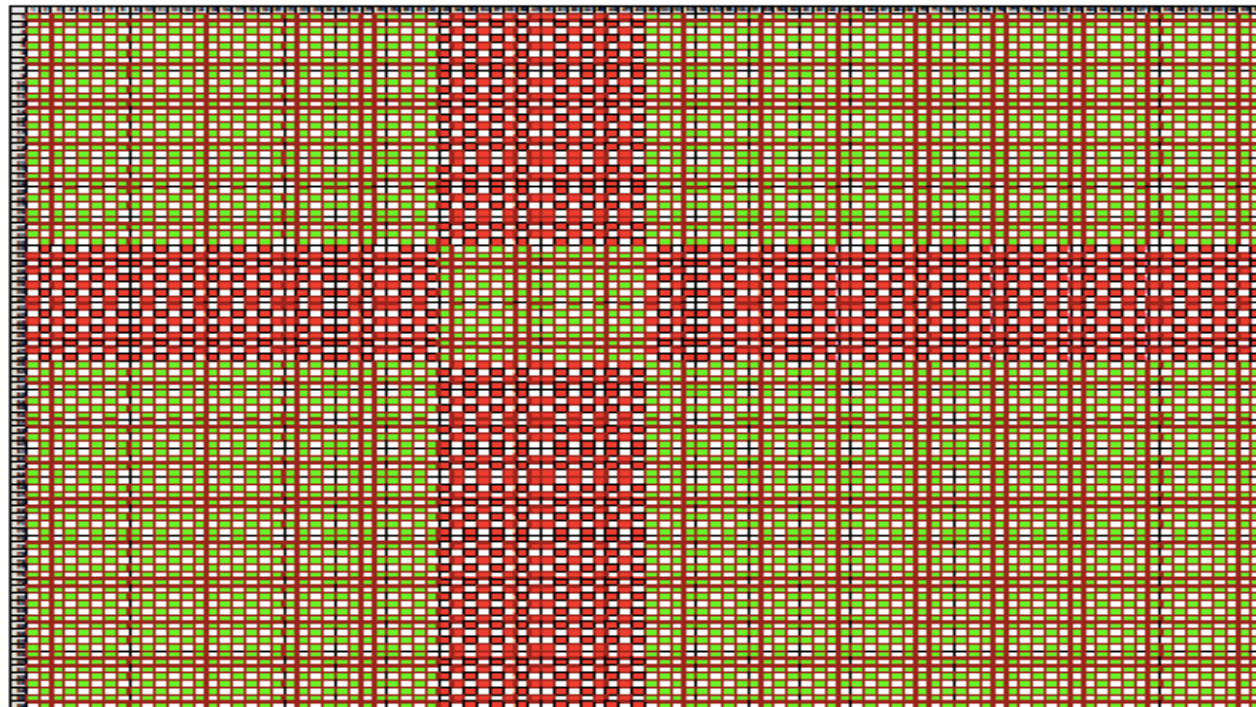
**ABSTRACT**

A Gadget, more precisely a scalar Gadget, is defined as a mathematical calculation acting over a domain of one or more adinkra graphs and whose range is a real number. A 2010 work on the subject of automorphisms of adinkra graphs, implied the existence of multiple numbers of Gadgets depending on the number of colors under consideration. For four colors, this number is two. In this work, we verify the existence of a second such Gadget and calculate (both analytically and via explicit computer-enabled algorithms) its 1,358,954,496 matrix elements over 36,864 minimal valise adinkras related to the Coxeter Group BC<sub>4</sub>.

Numerical Value	Color
- 1	
- 1/3	
0	
+ 1/3	
+ 1	

**Table 3: Color Key For Matrix Elements**

This <sup>5</sup> permits the visual representation for all the matrix elements of  $\mathcal{G}_{(1)}^{\text{BC}_4}$  shown in Fig. 1,



**Figure 1: Visual Representation of the Values in First Gadget Adinkra Representation Matrix**

and as well to illustrate the visual representation of the all matrix elements of  $\mathcal{G}_{(2)}^{BC_4}$  shown in Fig. 2.

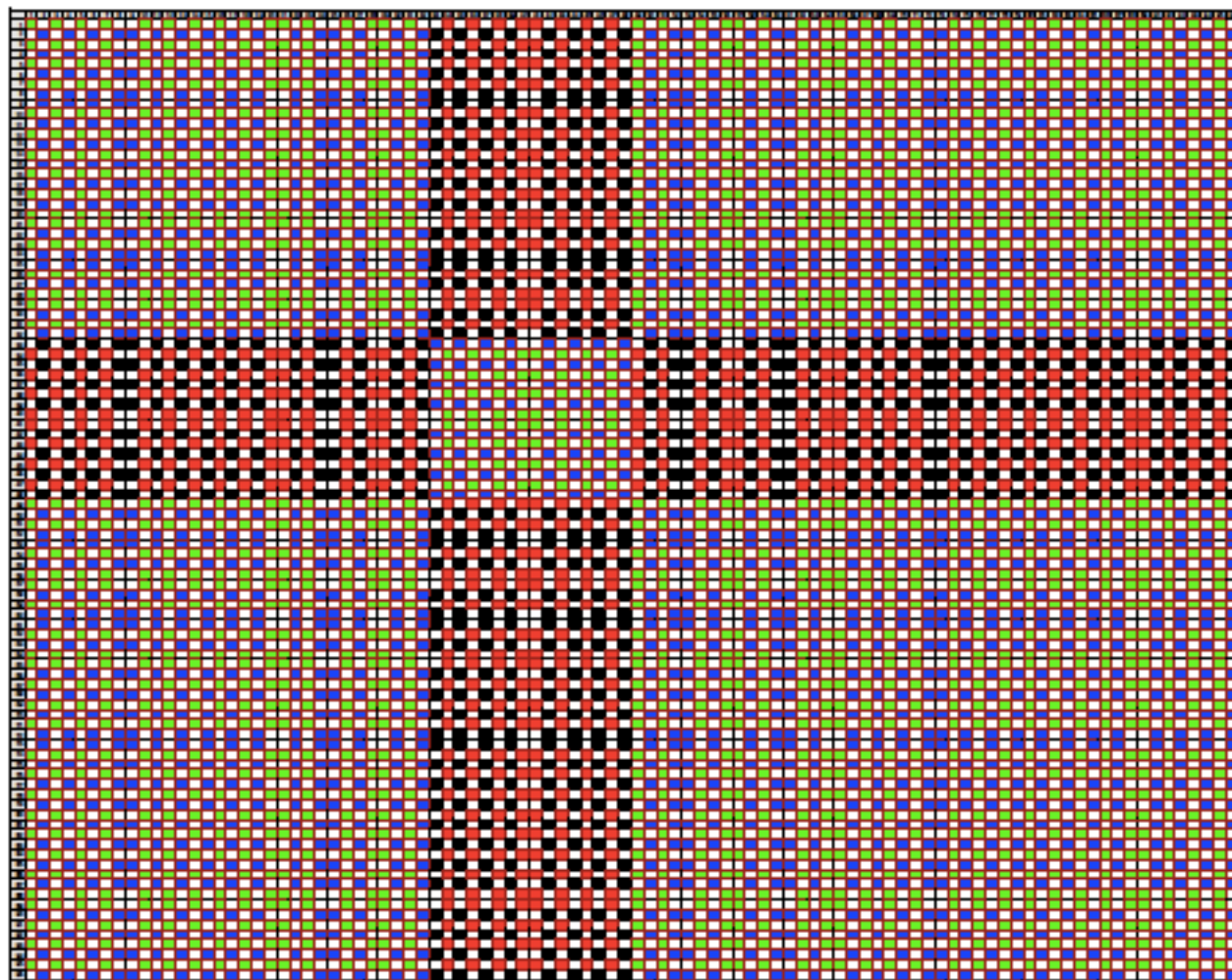


Figure 2: Visual Representation of the Values in Second Gadget Adinkra Representation Matrix



**Jim's Air Force**









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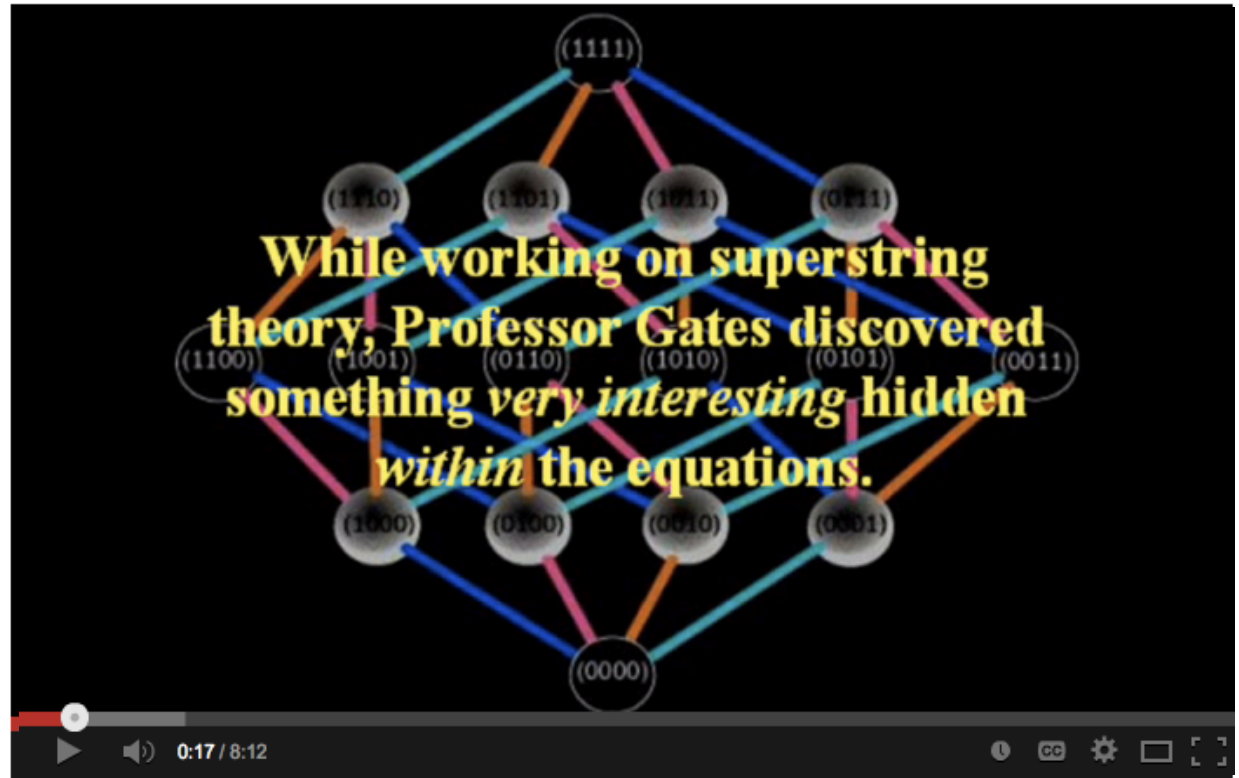
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Strange Computer Code Discovered Concealed In Superstring Eq...



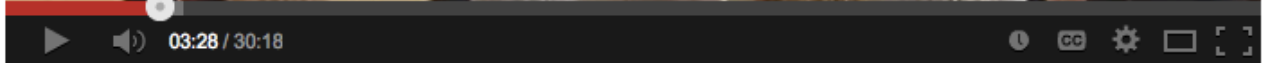
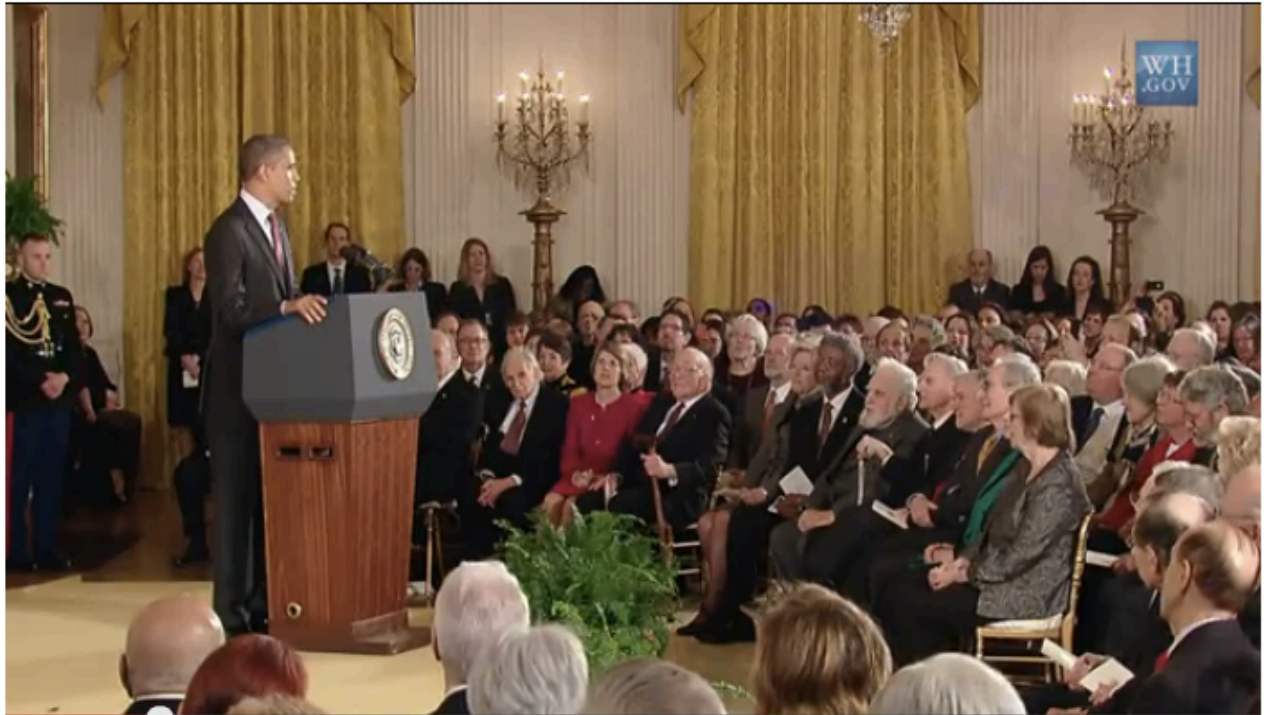
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# The Big Story

## Barack Obama, Sylvester James Gates



President Barack Obama laughs as he awards Dr. Sylvester James Gates, of the University of Maryland with the National Medal of Science, Friday, Feb. 1, 2013, during a ceremony in the East Room of the White House in Washington. The awards are the highest honors bestowed by the United States Government upon scientists, engineers, and inventors. (AP Photo/Carolyn Kaster)



## The Big Story

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## Meet the Black Scientist and Innovator Who Wowed Obama

By: Jenée Desmond-Harris | Posted: February 1, 2013 at 8:30 PM

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Sylvester James Gates Jr. and President Barack Obama (Getty Images)

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Sylvester James Gates Jr. and President Barack Obama (Getty Images)



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Sylvester James Gates Jr. and President Barack Obama (Getty Images)





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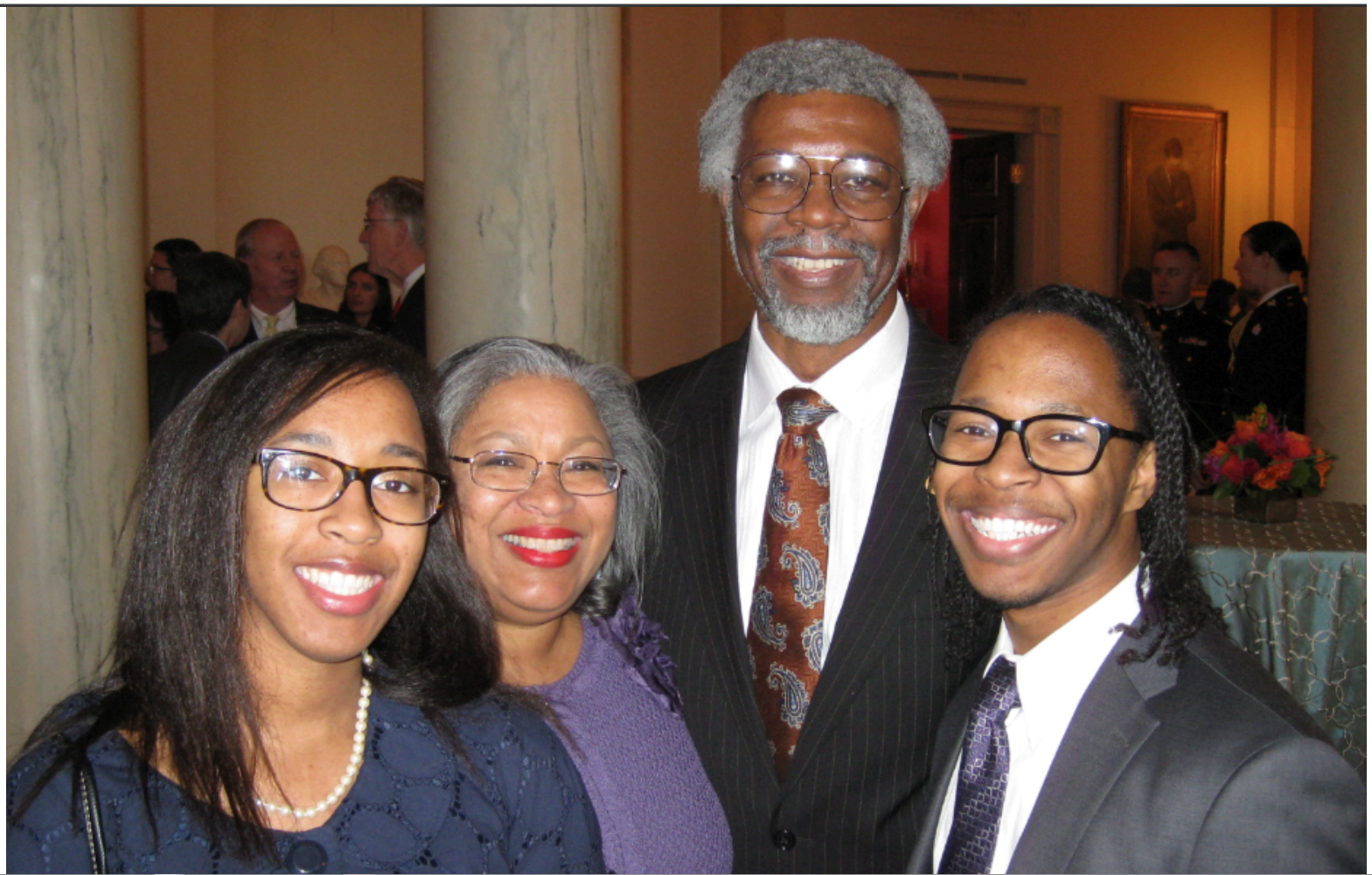
President Barack Obama attends the President's Council of Advisors on Science and Technology (PCAST) meeting in the State Dining Room of the White House, January 5, 2012. (Official White House Photo by Pete Souza)





Dan Schrag









Barack Obama







# Acknowledgment

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