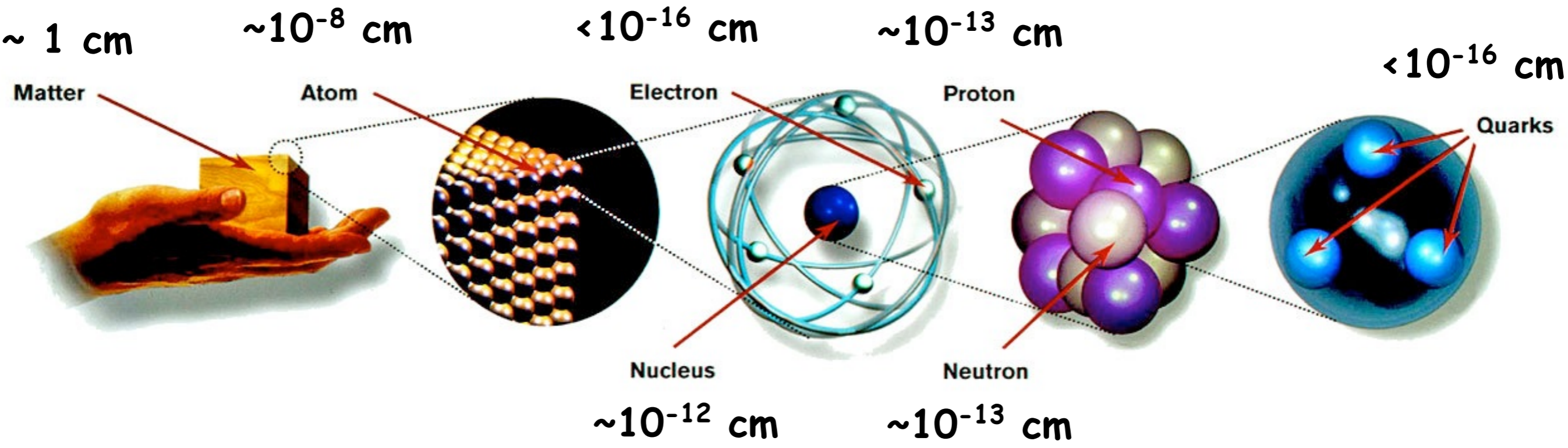




Exploring deeper and deeper...



...down to the building blocks of the Universe

What is Mass?

4th July 2012

Announcement of the discovery of the Higgs boson at LHC

4th July 2012

Announcement of the discovery of the Higgs boson at LHC



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Announcement of the discovery of the Higgs boson at LHC



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- 4. La Syrie ou "l'Archeipel de torture", selon HRW
- 5. Le dealer de cocaïne de Jean-Luc Delarue déçoit les exigences de son client
- 6. Vous avez trop bu, ce soir vous parliez

ヒッグス

平成24年7月5日 木曜日

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内参酒

Science

BREAKTHROUGH of the YEAR
The HIGGS BOSON

The New York Times

Wednesday, July 4, 2012 Last Update: 4:00 AM ET

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New Particle Could Be Physics' Holy Grail

By DENNIS OVERBYE 4 minutes ago

It is confirmed to be the elusive Higgs boson, a newly discovered particle that is named for the physicist Peter Higgs, above in Geneva.

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La particella che può svelare i segreti dell'universo

Scoperta al Cern di Ginevra il bosone di Higgs. Incontrare il professore che ne parlò 40 anni fa

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El País

Los científicos del CERN anuncian el descubrimiento de una partícula que podría ser Higgs. Sigue la videoconferencia en directo

La más sólida evidencia de la existencia del bosón de Higgs

La más sólida evidencia de la existencia del bosón de Higgs

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Haarscharf am gottverdammten Teilchen vorbei

Die Belege scheinen überwältigend: Forscher könnten ein neues Teilchen gefunden haben. Unklar ist, ob es das Higgs-Boson ist, der letzte Baustein im Weltbild der Physik. VON ROBERT GAST

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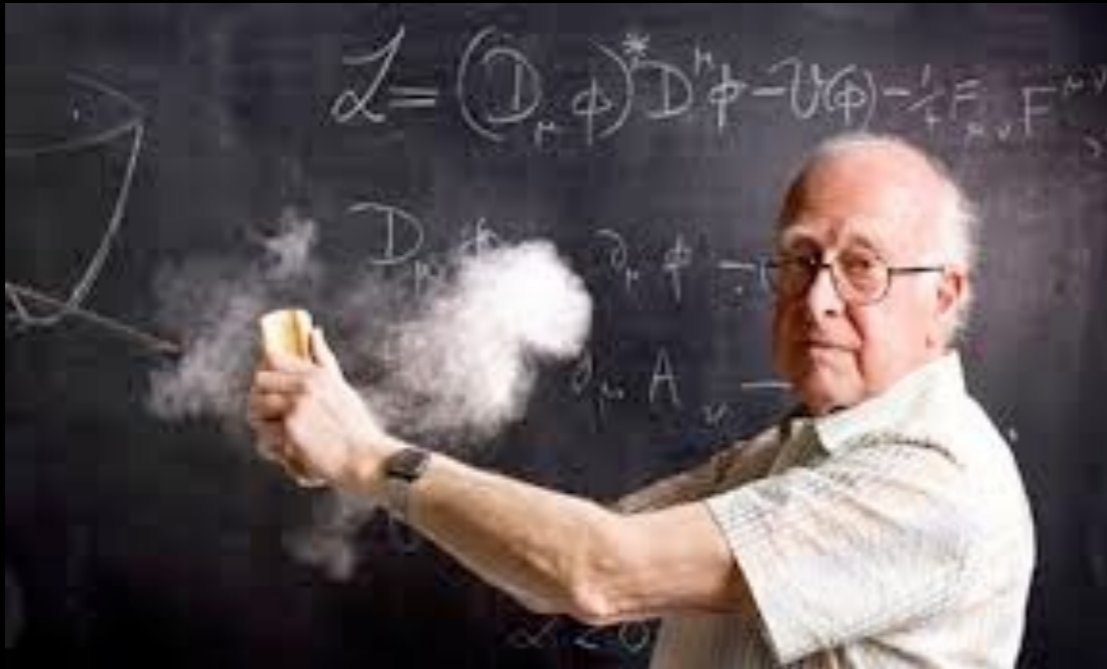
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O bosão de Higgs, que não tem nada a ver com Deus, é uma partícula muito importante

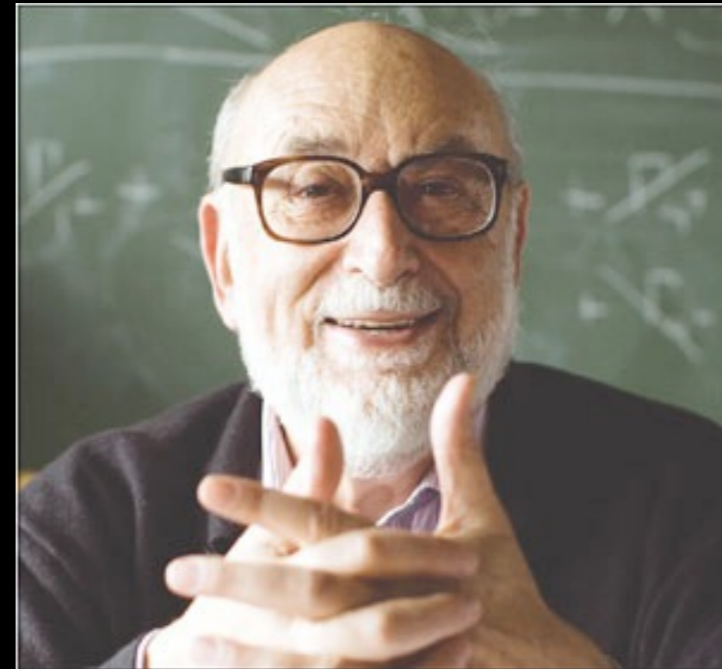
O bosão de Higgs, que não tem nada a ver com Deus, é uma partícula muito importante



Physics Nobel Prize 2013



Peter Higgs



François Englert



1964



1964

BROKEN SYMMETRIES AND THE MASSES OF GAUGE BOSONS

Peter W. Higgs

Tait Institute of Mathematical Physics, University of Edinburgh, Edinburgh, Scotland

(Received 31 August 1964)

In a recent note¹ it was shown that the Goldstone theorem,² that Lorentz-covariant field theories in which spontaneous breakdown of symmetry under an internal Lie group occurs contain zero-mass particles, fails if and only if the conserved currents associated with the internal group are coupled to gauge fields. The purpose of the present note is to report that, as a consequence of this coupling, the spin-one quanta of some of the gauge fields acquire mass; the longitudinal degrees of freedom of these particles (which would be absent if their mass were zero) go over into the Goldstone bosons when the coupling tends to zero. This phenomenon is just the relativistic analog of the plasmon phenomenon to which Anderson³ has drawn attention: that the scalar zero-mass excitations of a superconducting neutral Fermi gas become longitudinal plasmon modes of finite mass when the gas is charged.

The simplest theory which exhibits this behavior is a gauge-invariant version of a model used by Goldstone² himself: Two real⁴ scalar

about the "vacuum" solution $\varphi_1(x) = 0$, $\varphi_2(x) = \varphi_0$:

$$\partial^\mu \{ \partial_\mu (\Delta\varphi_1) - e\varphi_0 A_\mu \} = 0, \quad (2a)$$

$$\{ \partial^2 - 4\varphi_0^2 V''(\varphi_0^2) \} (\Delta\varphi_2) = 0, \quad (2b)$$

$$\partial_\nu F^{\mu\nu} = e\varphi_0 \{ \partial^\mu (\Delta\varphi_1) - e\varphi_0 A_\mu \}. \quad (2c)$$

Equation (2b) describes waves whose quanta have (bare) mass $2\varphi_0 \{ V''(\varphi_0^2) \}^{1/2}$; Eqs. (2a) and (2c) may be transformed, by the introduction of new variables

$$\begin{aligned} B_\mu &= A_\mu - (e\varphi_0)^{-1} \partial_\mu (\Delta\varphi_1), \\ G_{\mu\nu} &= \partial_\mu B_\nu - \partial_\nu B_\mu = F_{\mu\nu}, \end{aligned} \quad (3)$$

into the form

$$\partial_\mu B^\mu = 0, \quad \partial_\nu G^{\mu\nu} + e^2 \varphi_0^2 B^\mu = 0. \quad (4)$$

Equation (4) describes vector waves whose quanta

BROKEN SYMMETRY AND THE MASS OF GAUGE VECTOR MESONS*

F. Englert and R. Brout

Faculté des Sciences, Université Libre de Bruxelles, Bruxelles, Belgium

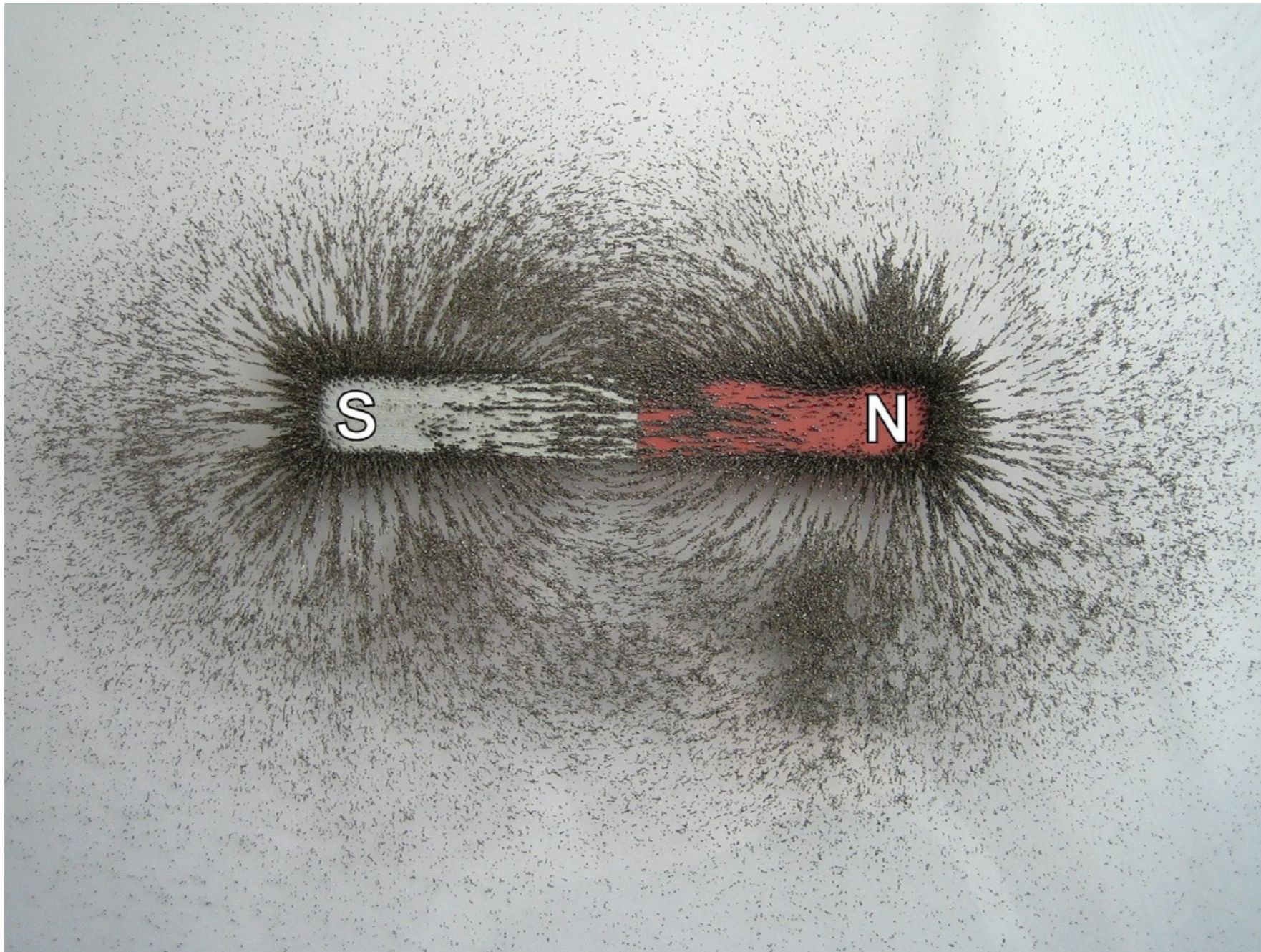
(Received 26 June 1964)

It is of interest to inquire whether gauge vector mesons acquire mass through interac-

those vector mesons which are coupled to currents that "rotate" the original vacuum are the



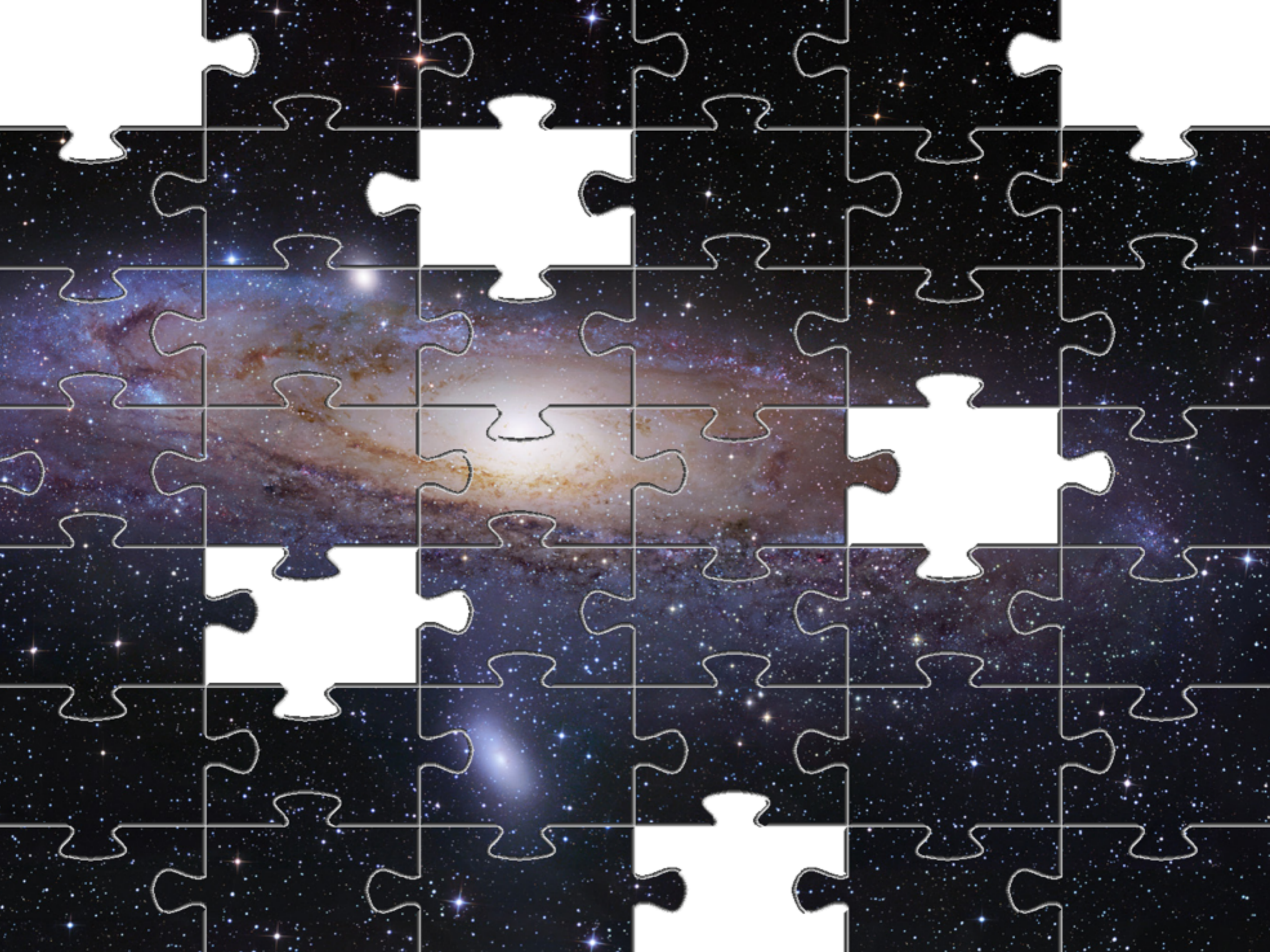
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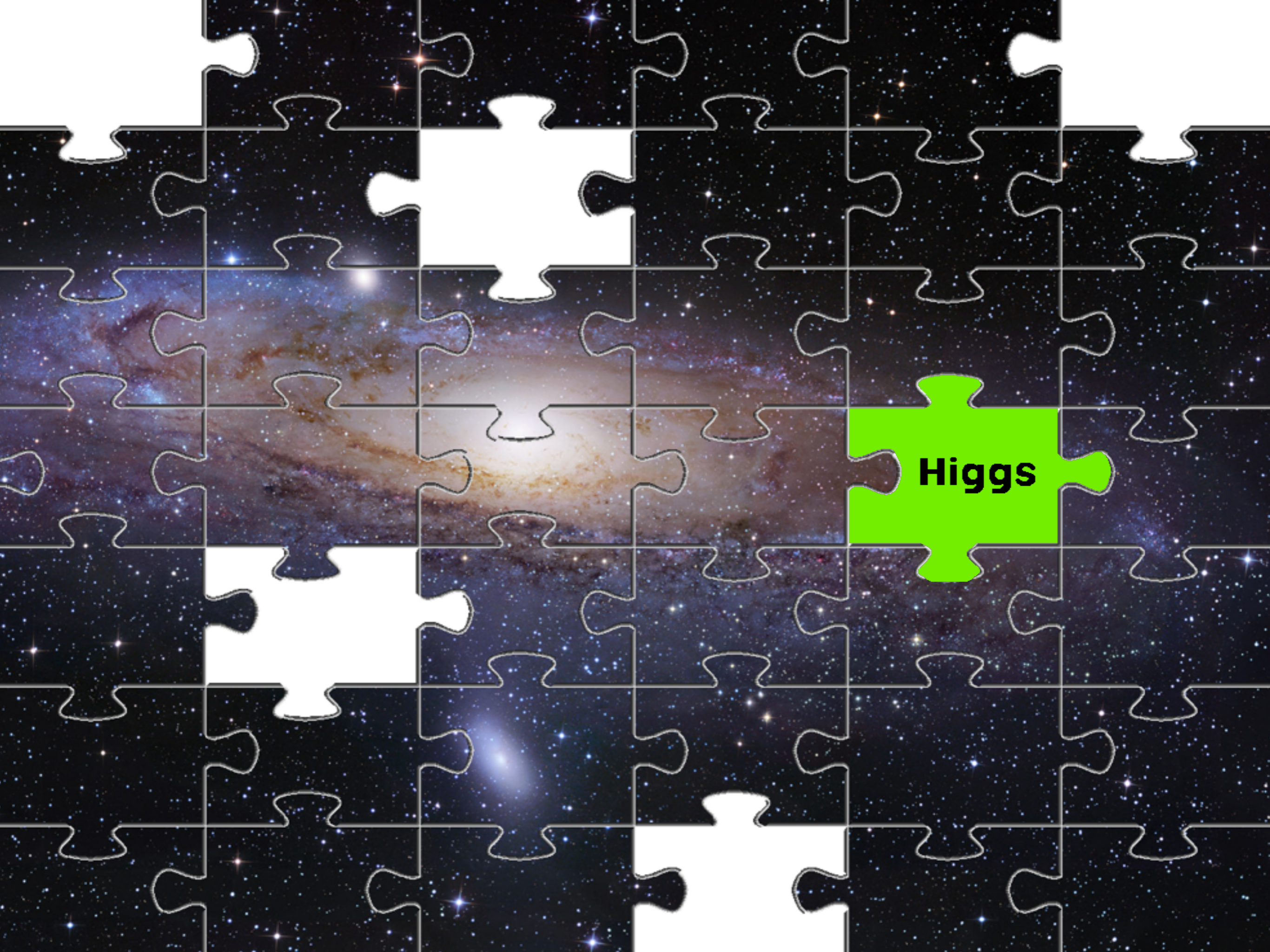


A MASSIVE Quest

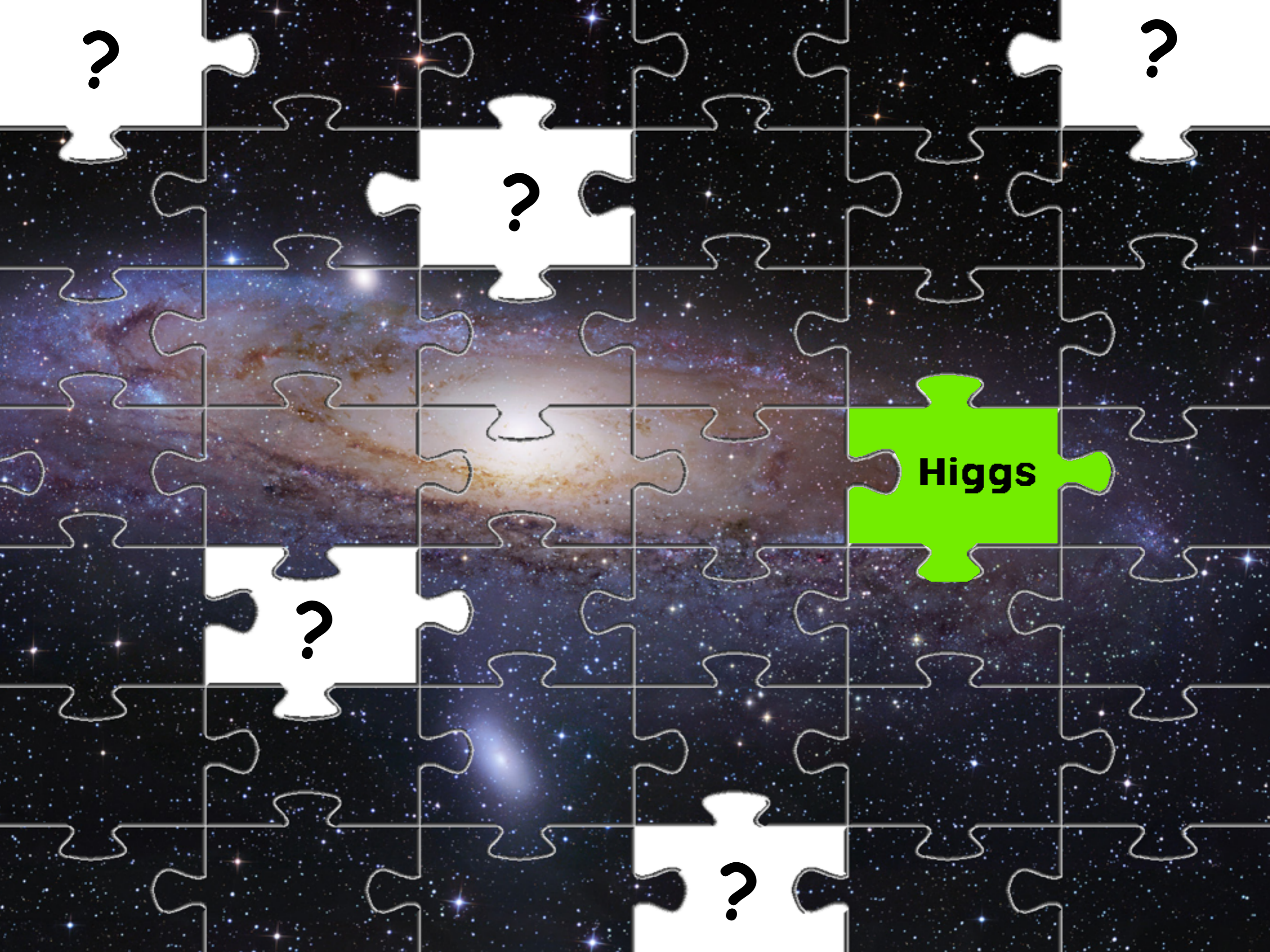
A MASSIVE Quest

The Higgs Mechanism





Higgs



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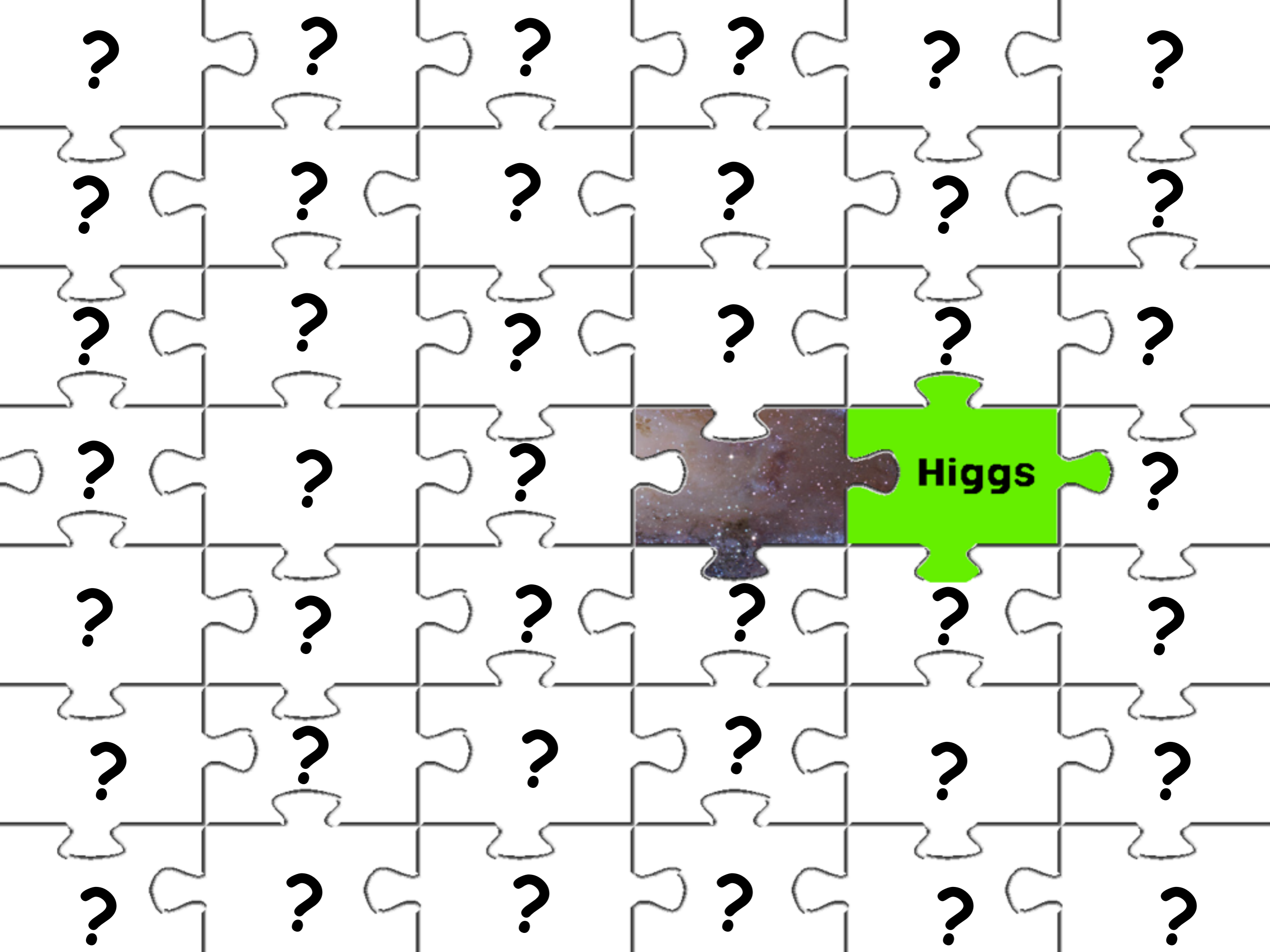
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Higgs

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Higgs

SAY GOD PARTICLE



**ONE MORE
GODDAMN TIME**