

A PRODUCTION BY
GROUP C



THE GRAVITY

ASTRO-PARTICLE SECURITY

11:00 AM



A Our theory of stuff is rich with particles! Electrons, photons, ... Imaginatively named the **STANDARD MODEL**

B Some particles make up matter (like protons/neutrons, atoms, us), collectively known as **fermions**

The rest are bosons and describe how the fermions interact with each other



C Someone is jealous of this richness... there's been a robbery! Mostly everything is missing, what we see left is only ~5%



B **AXION**
Incredibly lightweight particle
If heavily interacts with matter
Ability to convert into other particles

A **WIMP**
Heavy invisible particle
Doesn't like to interact with normal matter very often

C **STERILE NEUTRINO**
Neither heavy nor light
Doesn't interact with stuff anything else
Hard to detect, like a ghost slipping through walls without leaving a trace

WIMP

PRIME SUSPECTS!

AXION

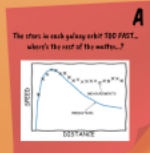
STERILE NEUTRINO

A Dark Matter could interact with visible matter
What we search for: [red diamond] [red diamond]
What we can see: [red diamond]

B Dark Matter could produce visible matter
What we search for: [red diamond] [red diamond]
What we can see: [red diamond]

C Visible matter could produce Dark Matter
What we search for: [red diamond] [red diamond]
What we can see: [red diamond]

What we search for... particle of interest
[red diamond] [red diamond]
What we already know
[red diamond]

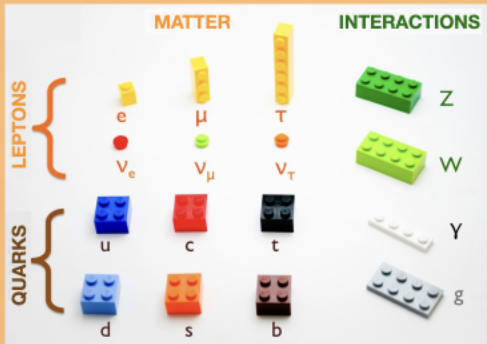


B How will we ever find the culprit? It's completely invisible to light...
[red diamond]

THE CRIME SCENE
[red diamond]
[red diamond]



Astro-particle Security Dep.

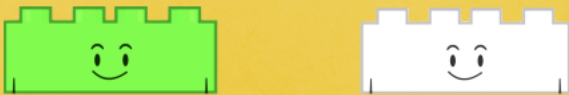


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 Electrons, photons, ...
 Imaginatively named the **STANDARD MODEL**

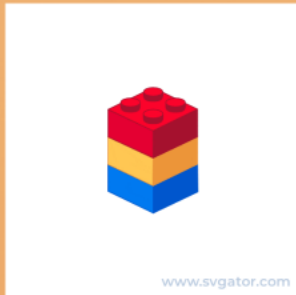
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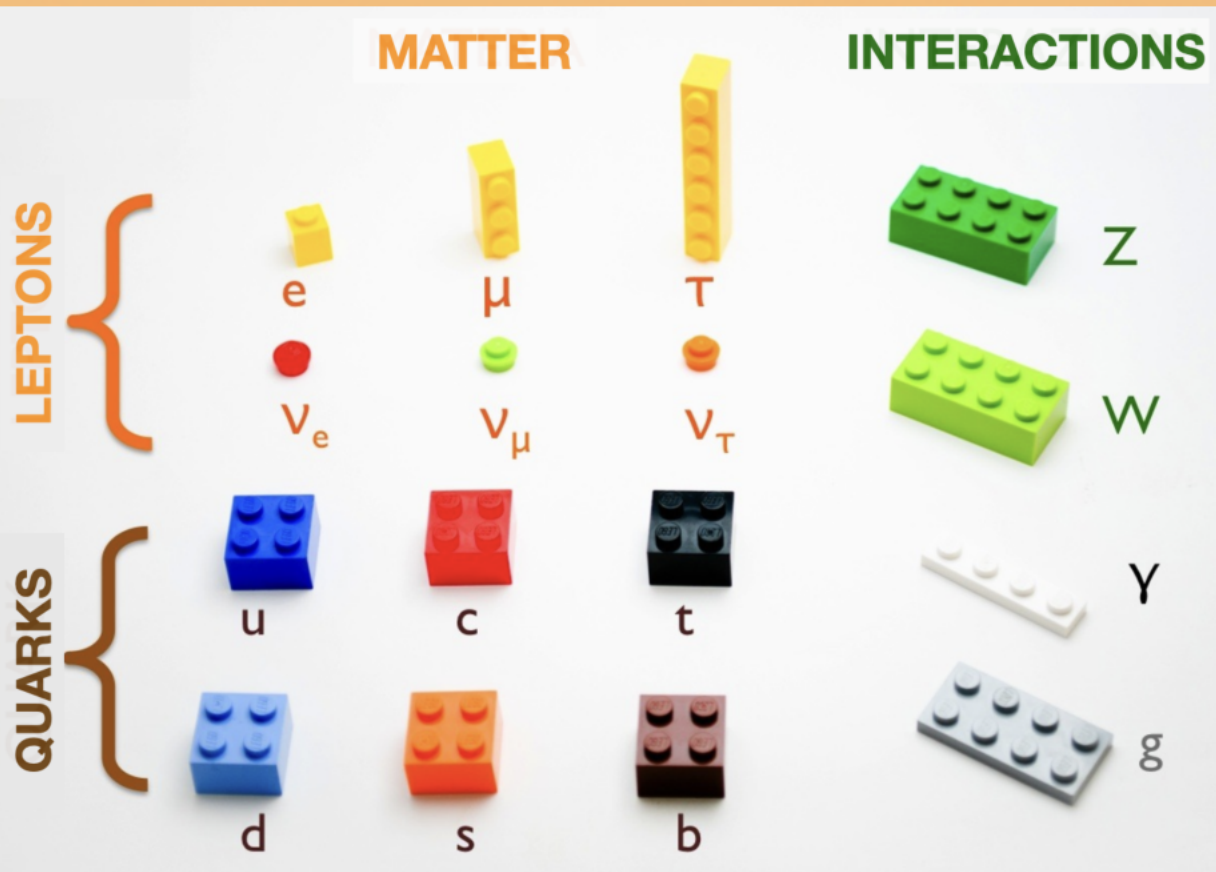


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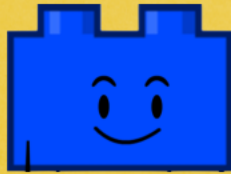
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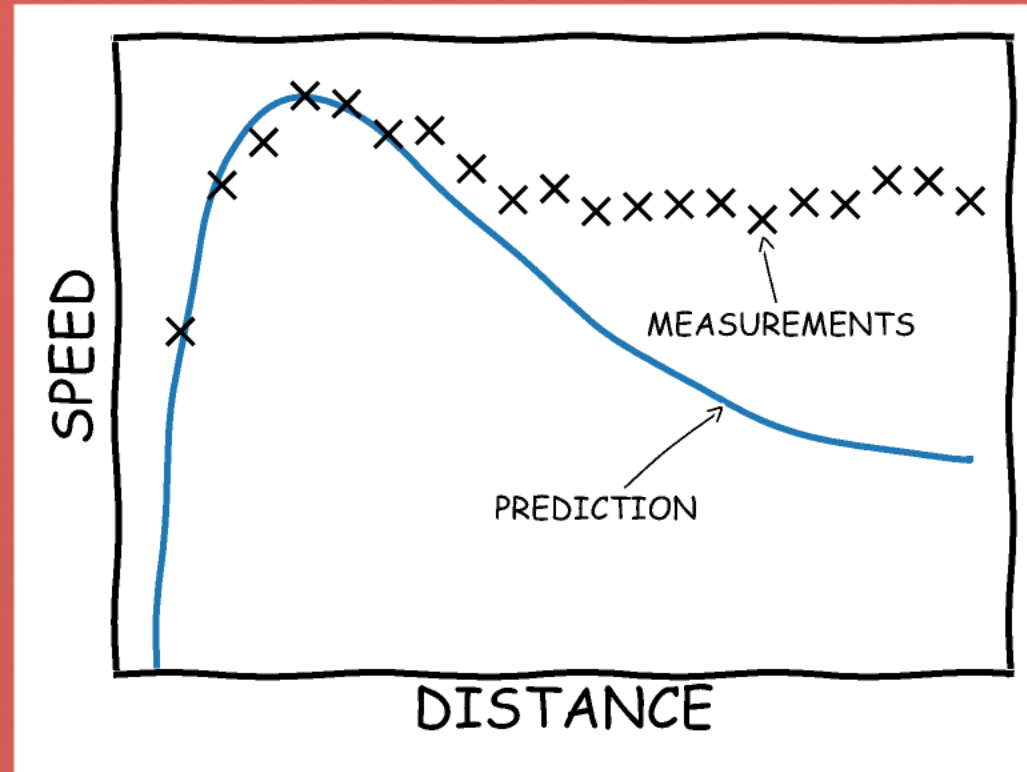
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A

The stars in each galaxy orbit TOO FAST...
where's the rest of the matter...?



B

How will we ever find the culprit?
it's completely invisible to light...





WIMP

PRIME SUSPECTS!

AXION

STERILE

NEUTRINO

ten

A

WIMP



Heavy invisible particle

Doesn't like to interact with normal matter very often

B

AXION



Incredibly lightweight particle



It hardly interacts with matter



Ability to convert into other particles

C *STERILE NEUTRINO*



*Neither heavy
nor light*



*Doesn't interact
much with
anything else*



*Hard to detect, like a ghost slipping through
walls without leaving a trace*



WIMP

PRIME SUSPECTS!

AXION

STERILE


NEUTRINO


A Dark Matter could interact with visible matter

What we search for

What we can see



 DM candidate


What we know 


B Dark Matter could produce visible matter

What we search for

What we can see



 DM candidate

What we know 





C Visible matter could produce Dark Matter

What we search for

What we can see



 DM candidate

What we know 

What we search for... particle of interest



What we already know



A

Dark Matter could interact with visible matter

What we search for



DM candidate

What we can see



What we know



B Dark Matter could produce visible matter

What we search for

What we can see



DM candidate

What we know



C

Visible matter could produce Dark Matter

What we search for

What we can see



DM candidate

What we know





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- Incredibly lightweight particle
- It hardly interacts with matter
- Ability to convert into other particles

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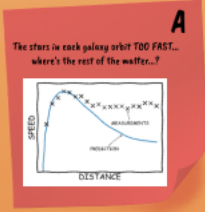
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TO BE CONTINUED...