

# COMMUNICATING YOUR SCIENCE

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# DATA VISUALIZATION

GIVING AN EFFECTIVE TALK TO  
ANY AGE GROUP AND/OR  
BACKGROUND



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HAVE YOU EVER FOLLOWED A BRAND ON TWITTER?

25.5%

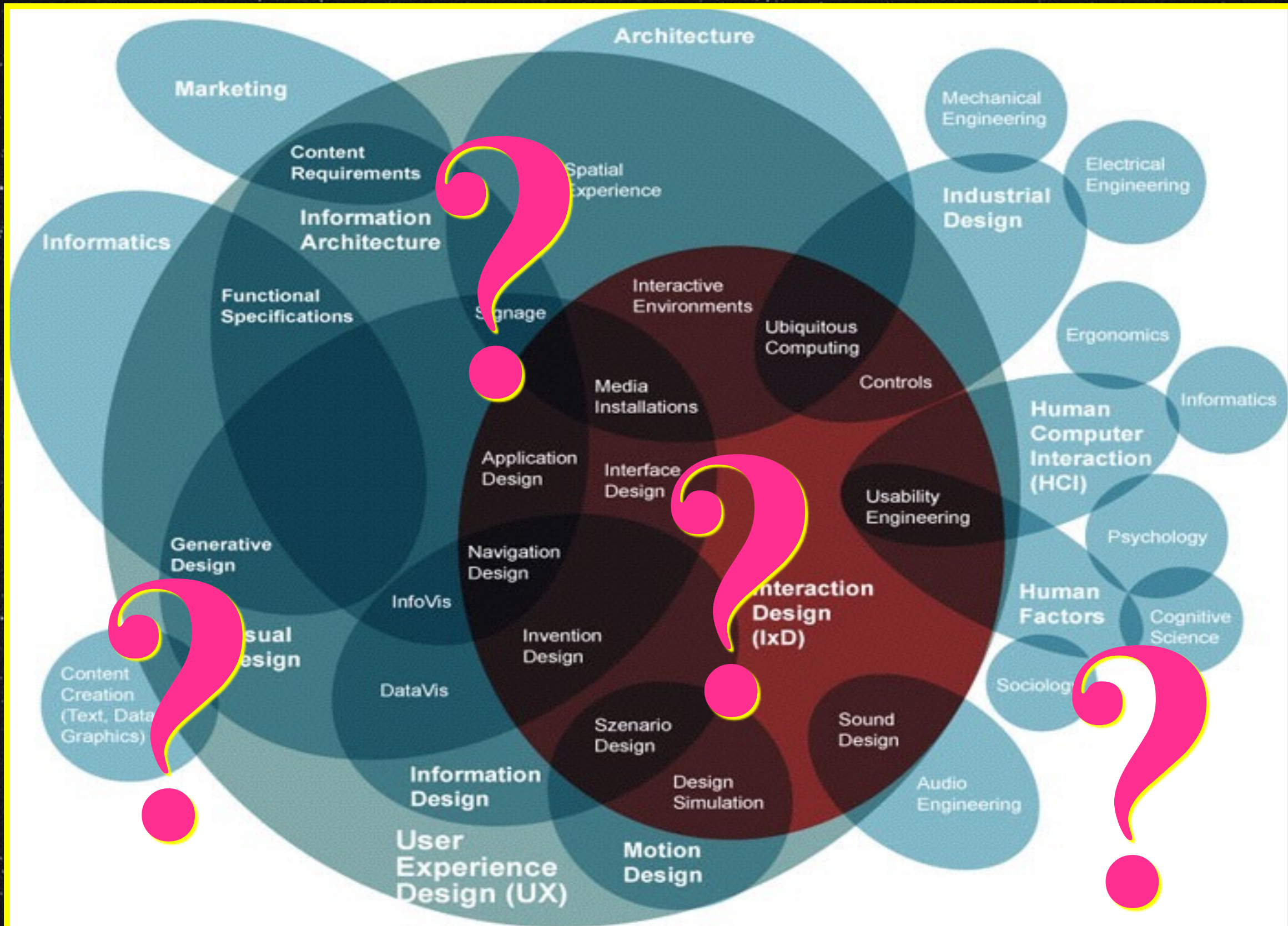
YES

74.5%

NO

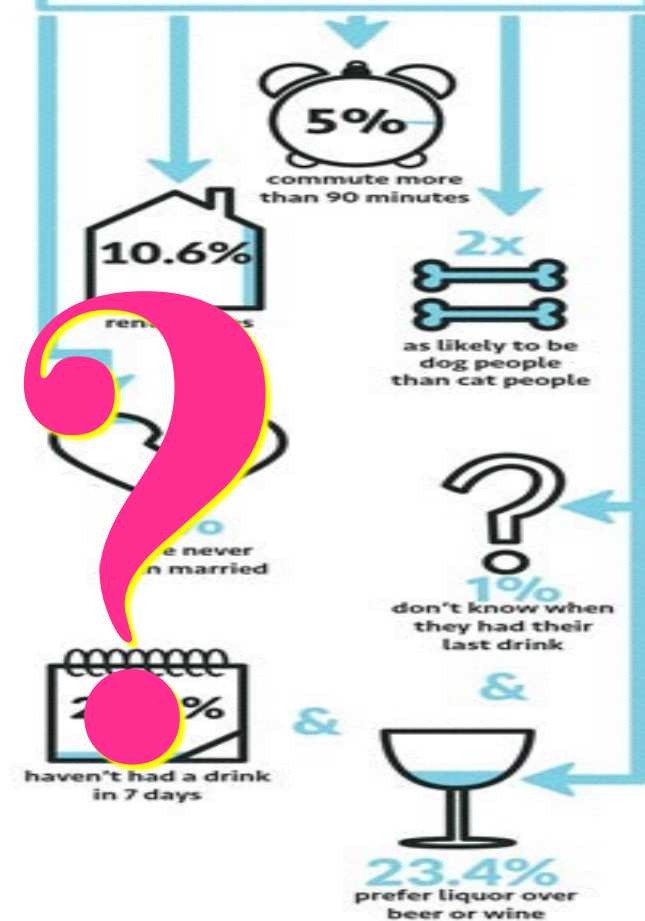
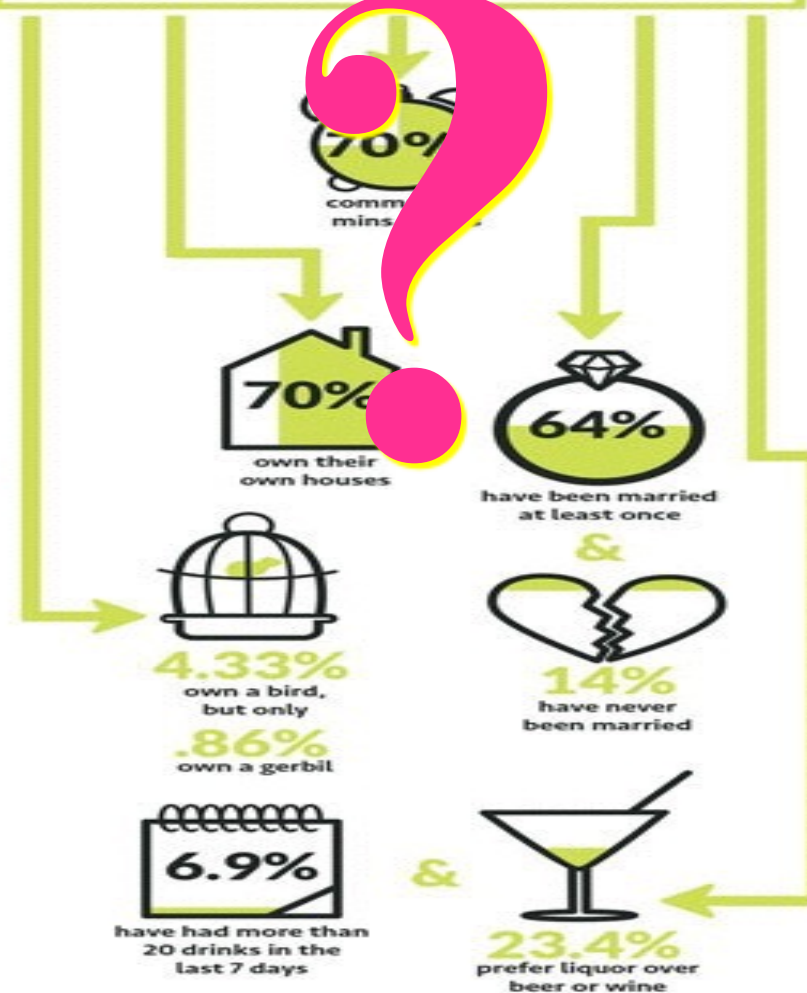
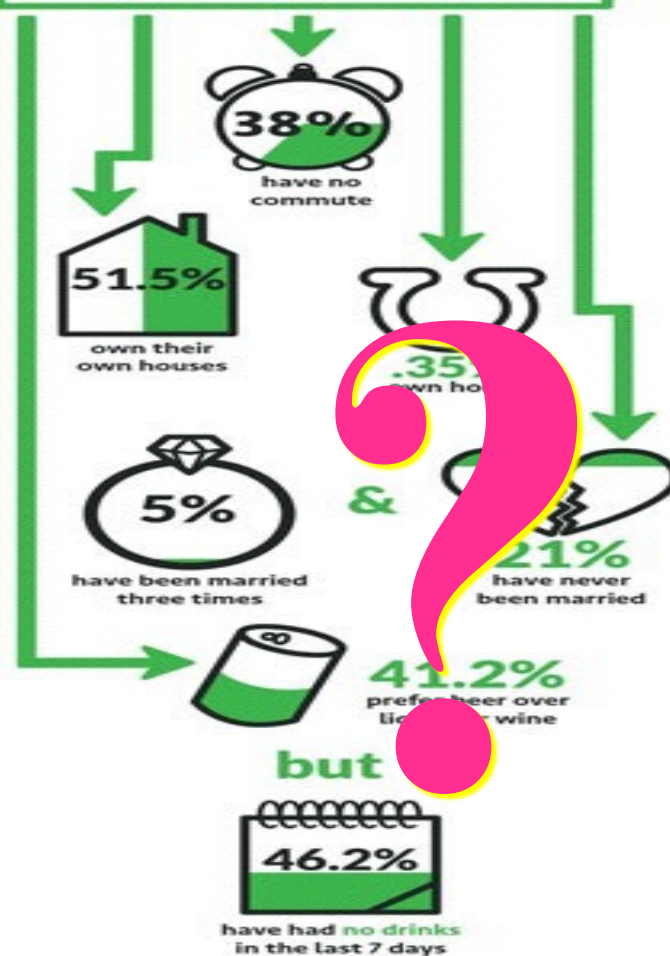
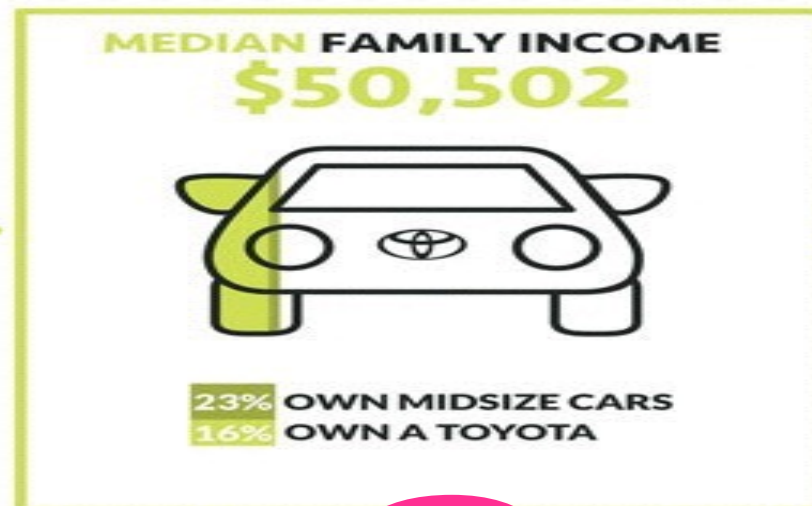
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# INCOME/OUTCOME: from the Marketplace Wealth & Poverty desk



## THE GREAT EQUALIZER

In most states, the legal limit to drive a car (whether it's Chevy Sonic, Toyota Camry or a Benz SUV) is a BAC or .08%. Please, don't drink (wine, beer or liquor) and drive.





**CarWool! users**

Already using CarWool! to simplify their car buying experience. We've got the love letters to prove it.



**Saved per user**

Because we all have better things to do than spend our week on a car lot.



**Phone calls avoided**

Because only your mother should be interrupting dinner.



**Dealer partners**

Ready to communicate with you through the interwebs the way that Al Gore originally intended.





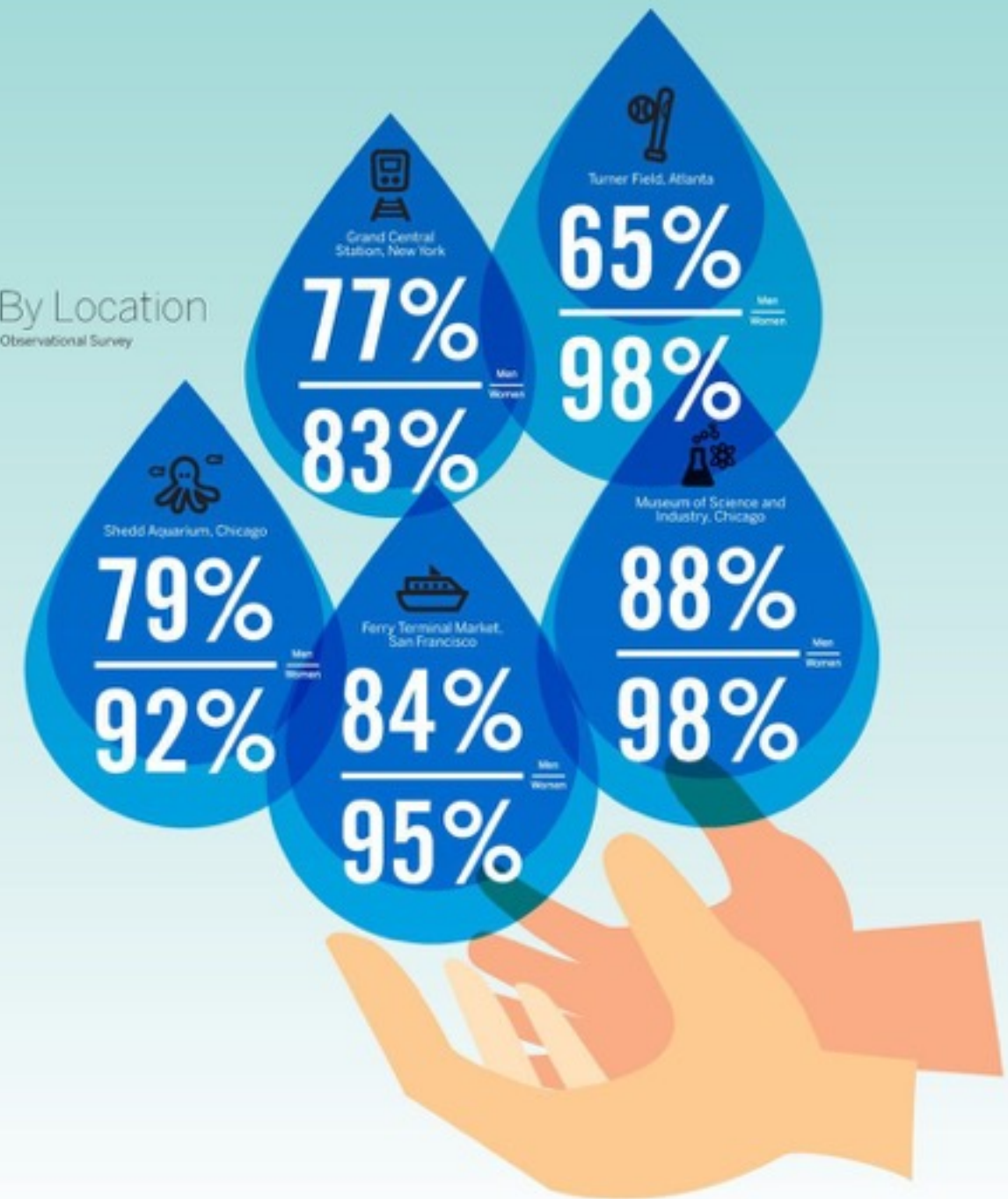
# Who's Not Washing Their Hands?

Cold season is upon us, and the constant advice you will hear from doctors and friends is to keep washing your hands. Everyone claims they do, but do they really? A recent study found that although most people claim to wash their hands after dirty activities, when you observe them in person, the story (especially for men) is a little different.



## By Location

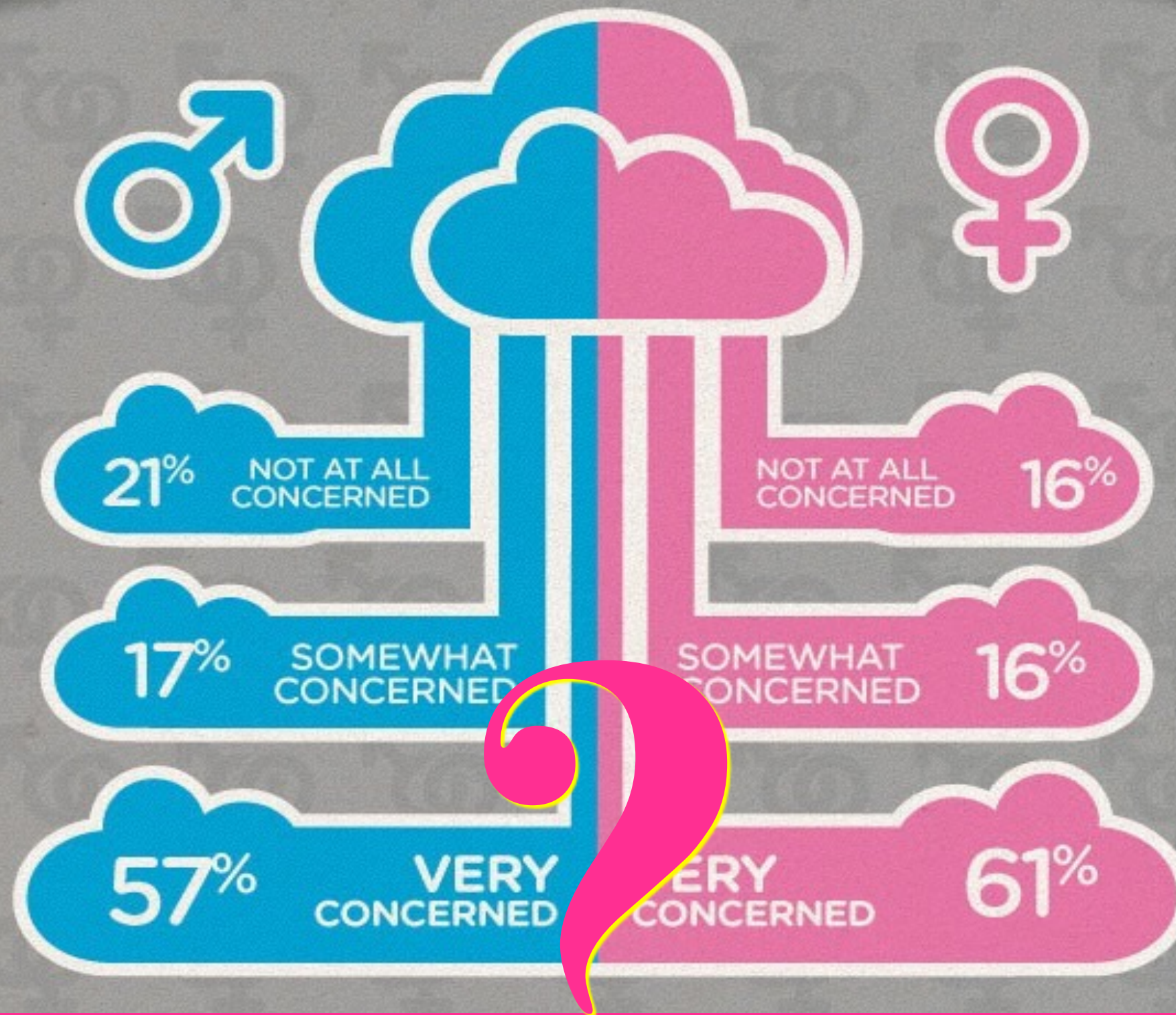
Observational Survey



A collaboration between GOOD and Albertson Design  
SOURCE: The American Society for Microbiology and the American Cleaning Institute

*Creepy...*





= 95 %

= 83 %



LESSONS FROM BAD DATA

VISUALIZATION:

CONVEY YOUR POINT IN THE  
CLEAREST AND SIMPLEST  
WAY POSSIBLE !!



A Venn diagram with three overlapping circles on a starry night sky background. The top-left circle is dark purple and labeled 'DATA'. The top-right circle is dark blue and labeled 'FUNCTION'. The bottom circle is teal and labeled 'DESIGN'. The intersections are labeled in green: 'Rigid, Unappealing' for Data and Function; 'Pretty, Illegible' for Data and Design; 'Lacks Information' for Function and Design; and 'BEAUTIFUL, INFORMATIVE' for the central intersection of all three.

DATA

Rigid,  
Unappealing

FUNCTION

BEAUTIFUL,  
INFORMATIVE

Pretty,  
Illegible

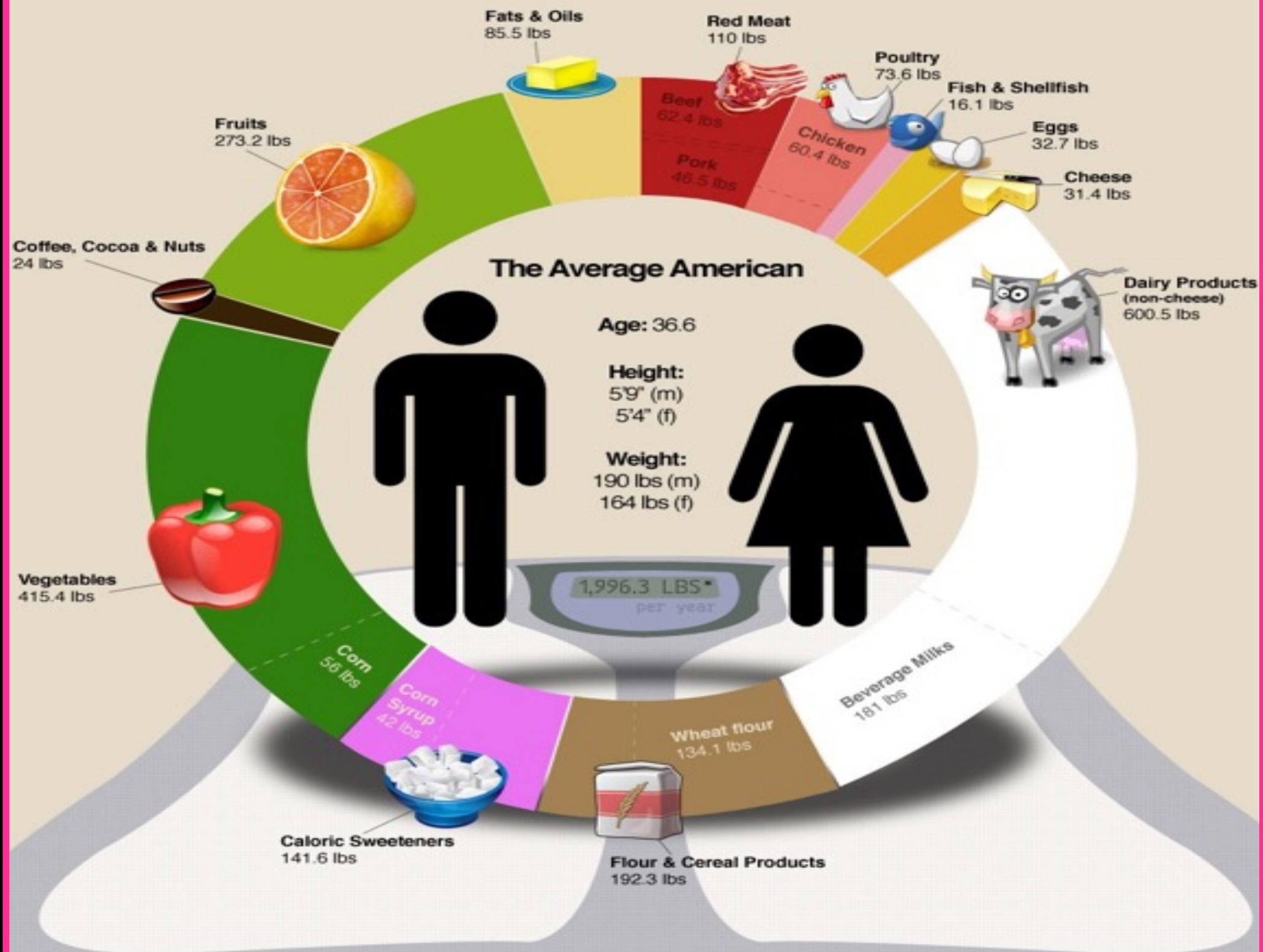
Lacks  
Information

DESIGN



# WHAT ARE WE EATING?

What the Average American Consumes in a Year

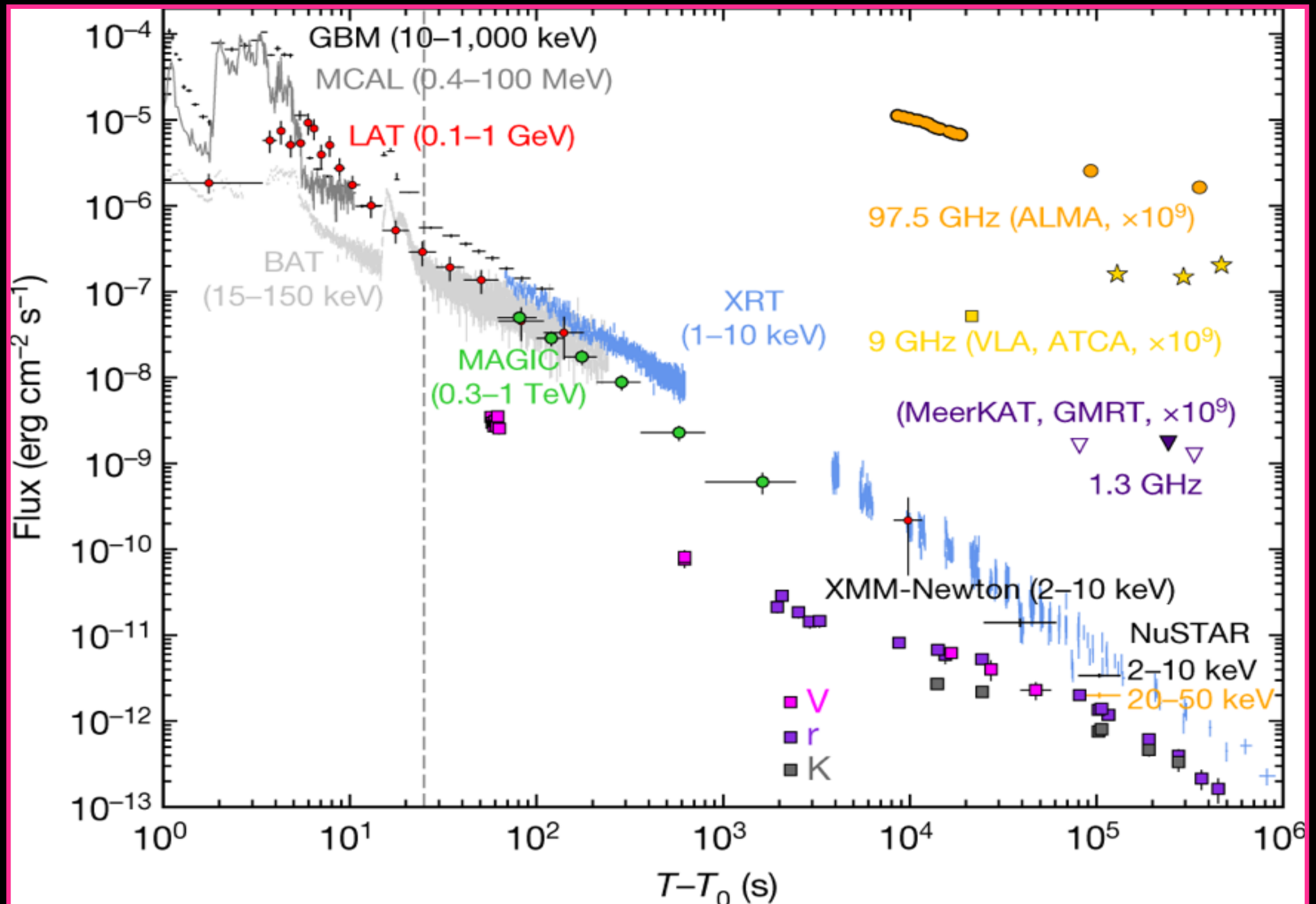




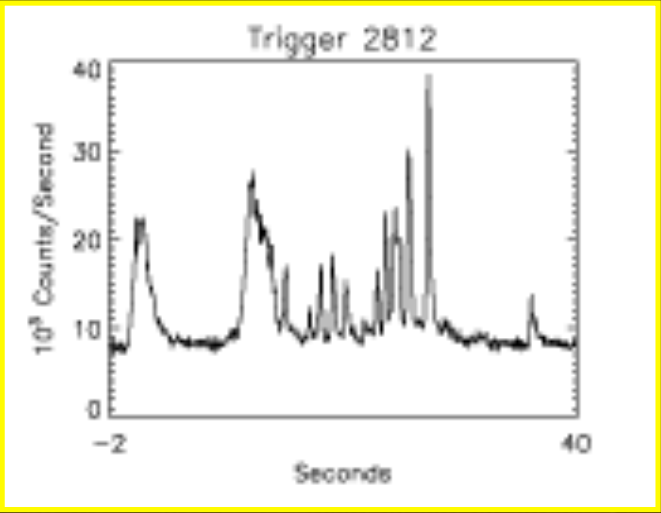
# SCIENCE EXAMPLES



# GAMMA-RAY BURST LIGHT CURVE







Jet collides with ambient medium (external shock wave)

Colliding shells emit low-energy gamma rays (internal shock wave)

High-energy gamma rays

X-rays

Visible light

Radio

Slower shell

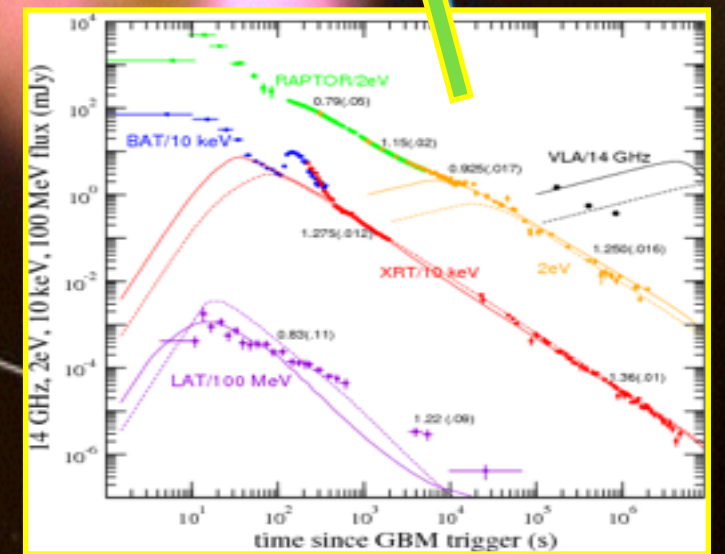
Faster shell

Low-energy gamma rays

Black hole engine

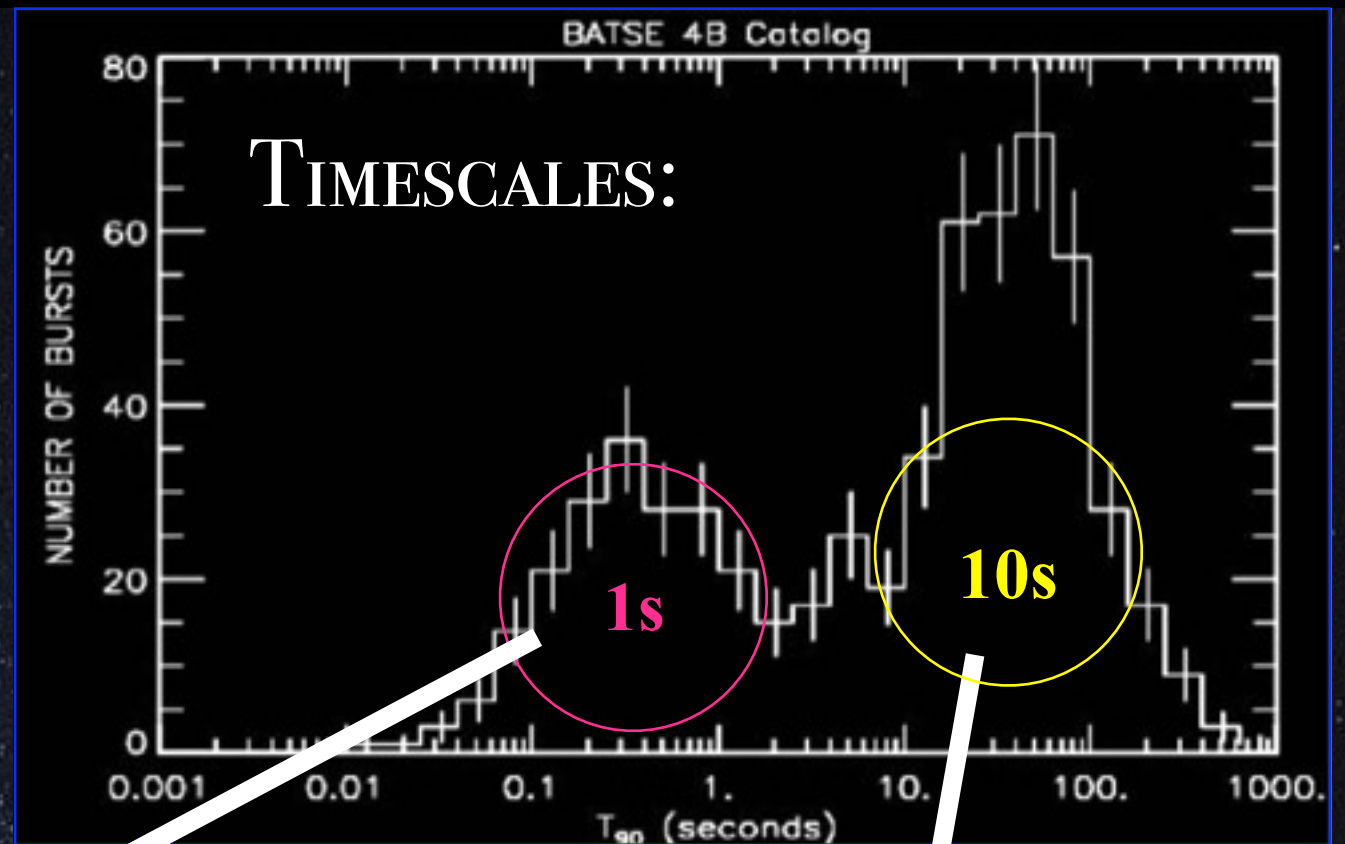
Prompt emission

# Gamma-ray Bursts



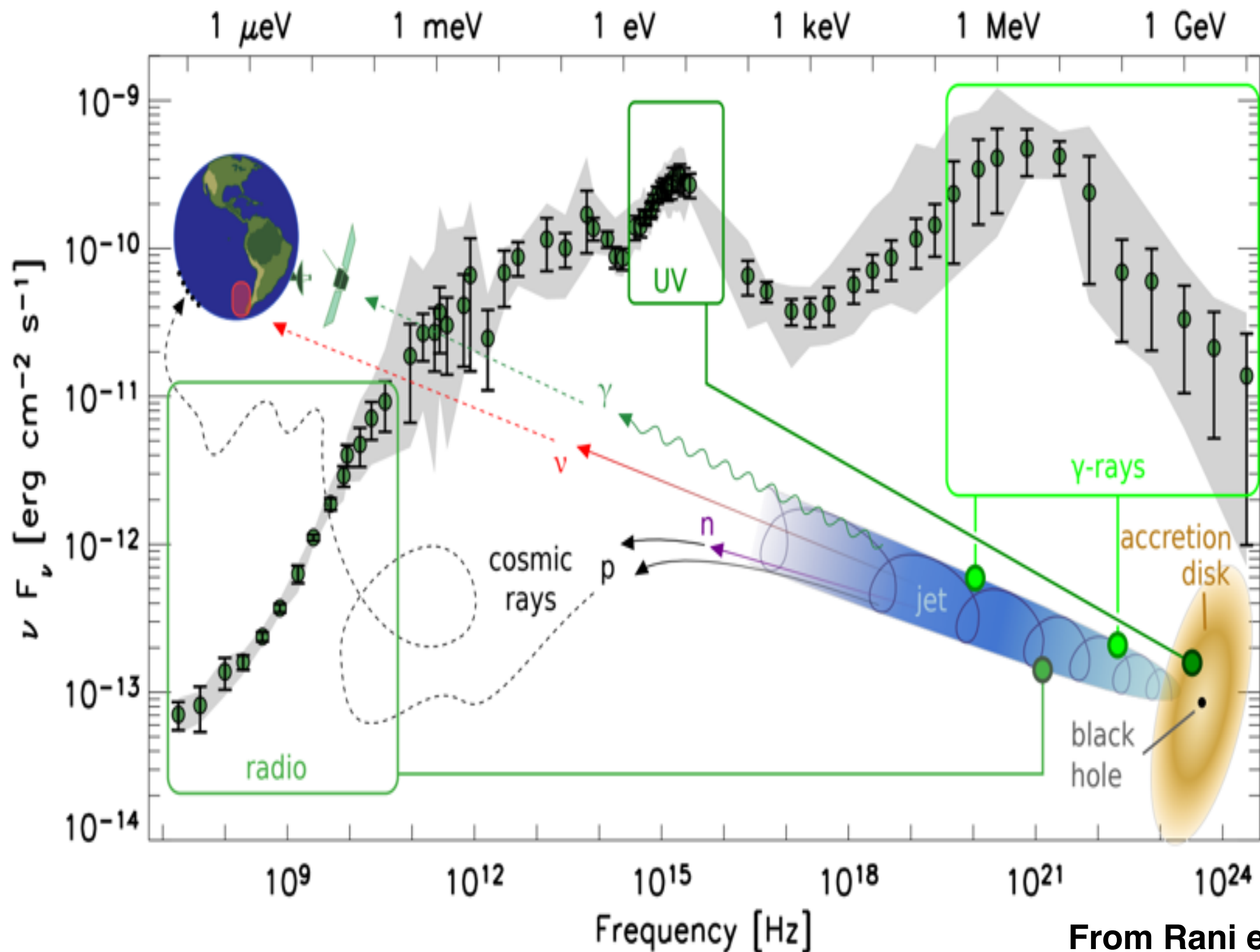


***Gamma-ray Bursts  
group into two classes  
based on how long the  
variable gamma-ray  
emission lasts.***



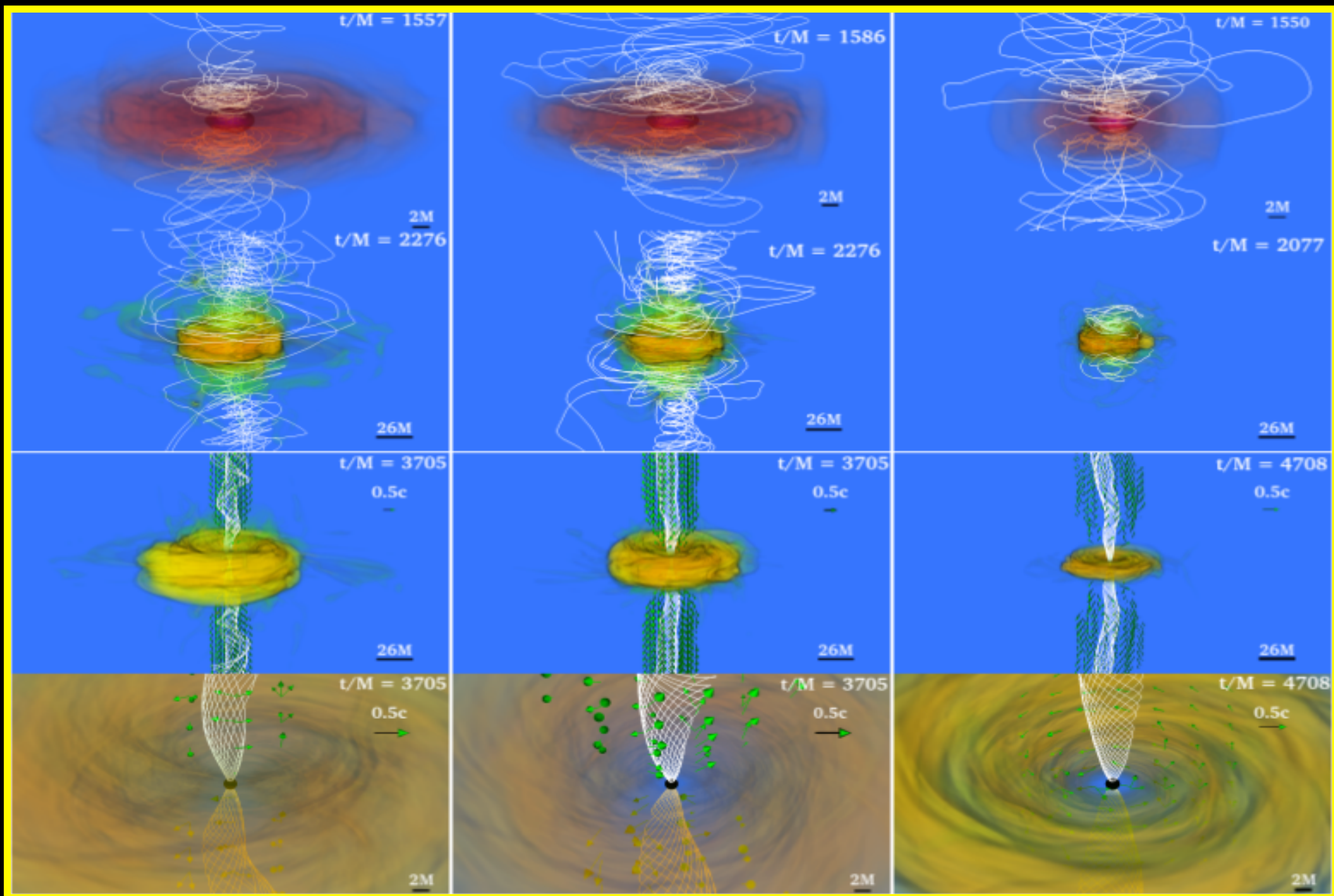


# AGN SPECTRUM

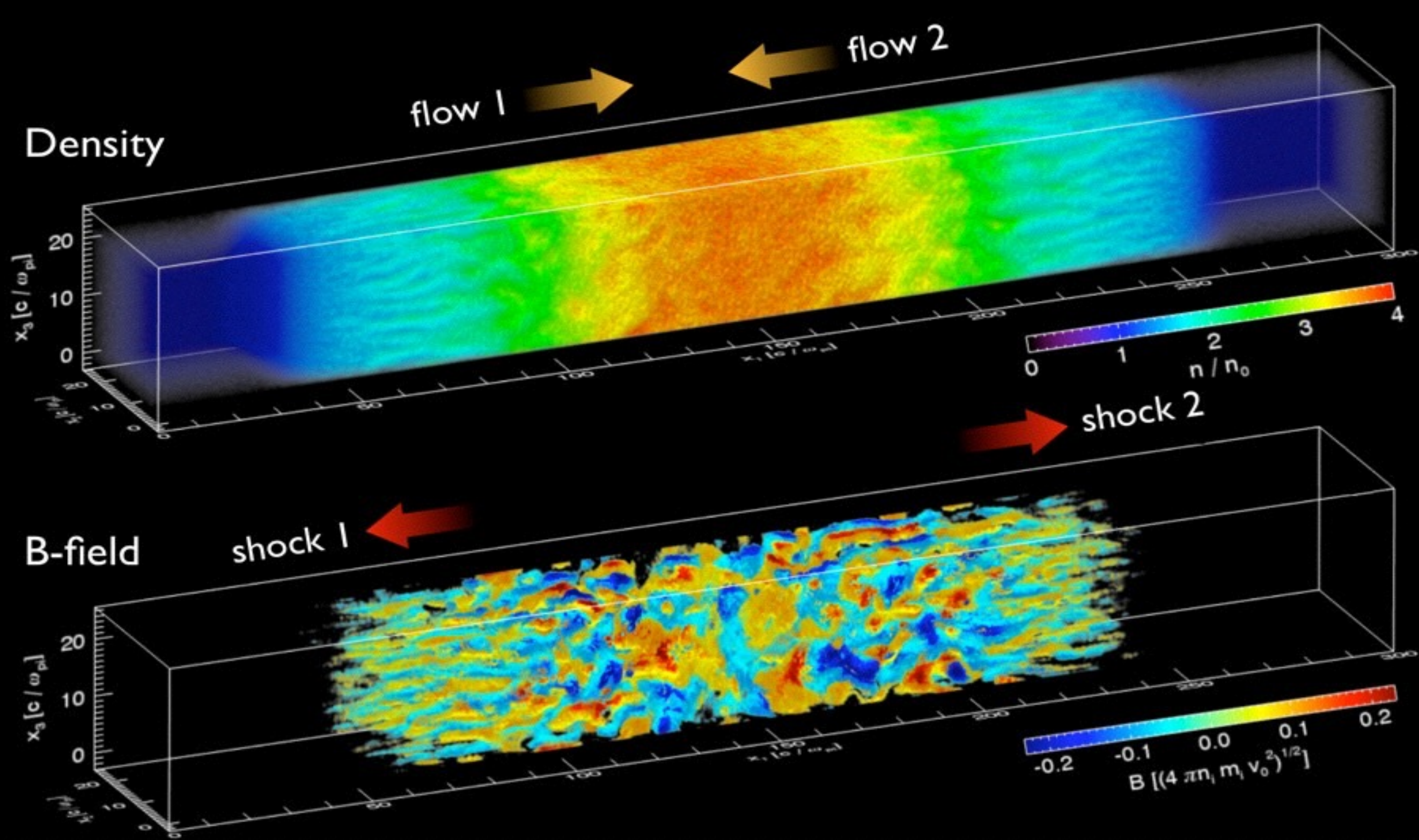


From Rani et al. 2019

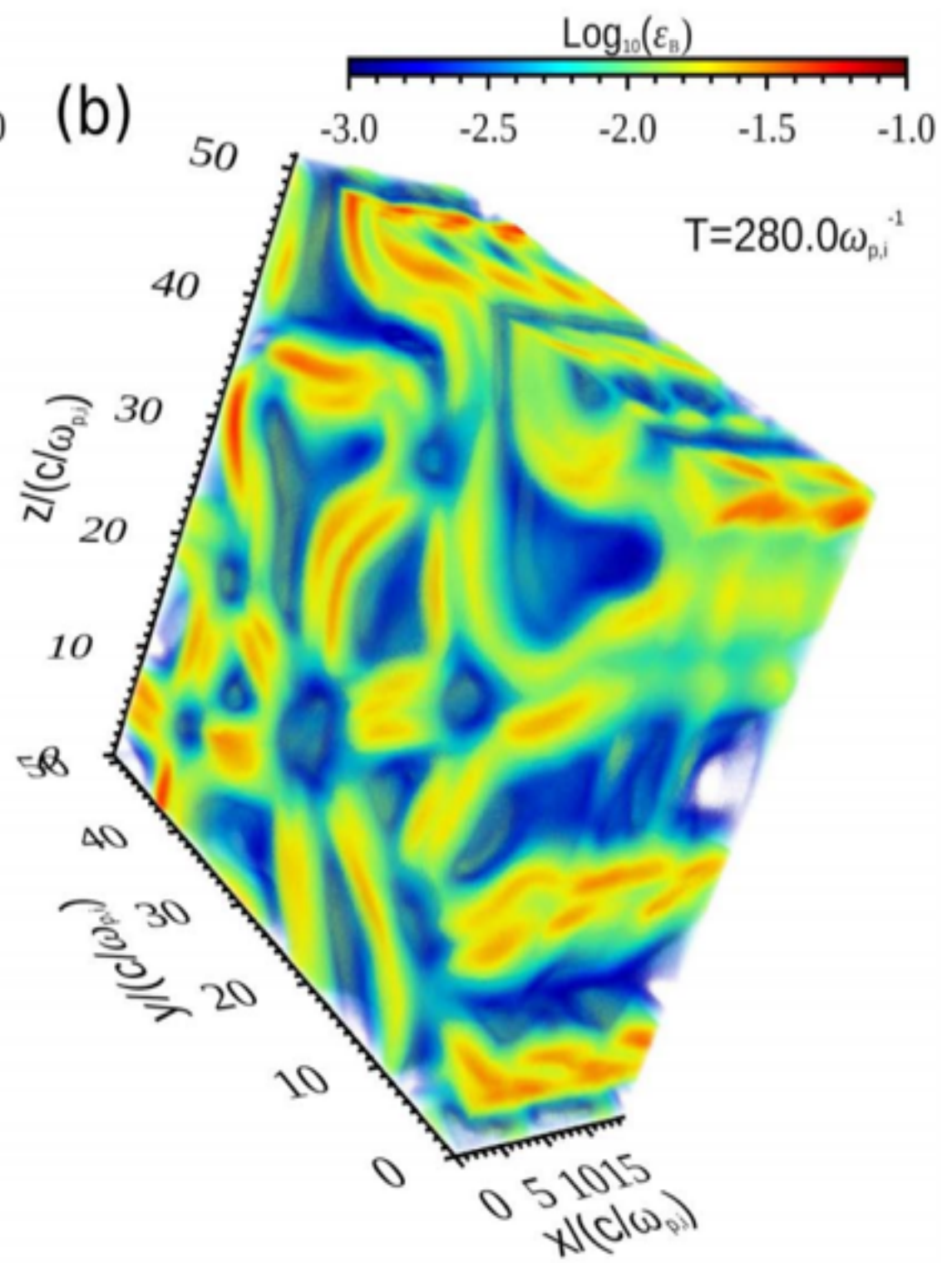
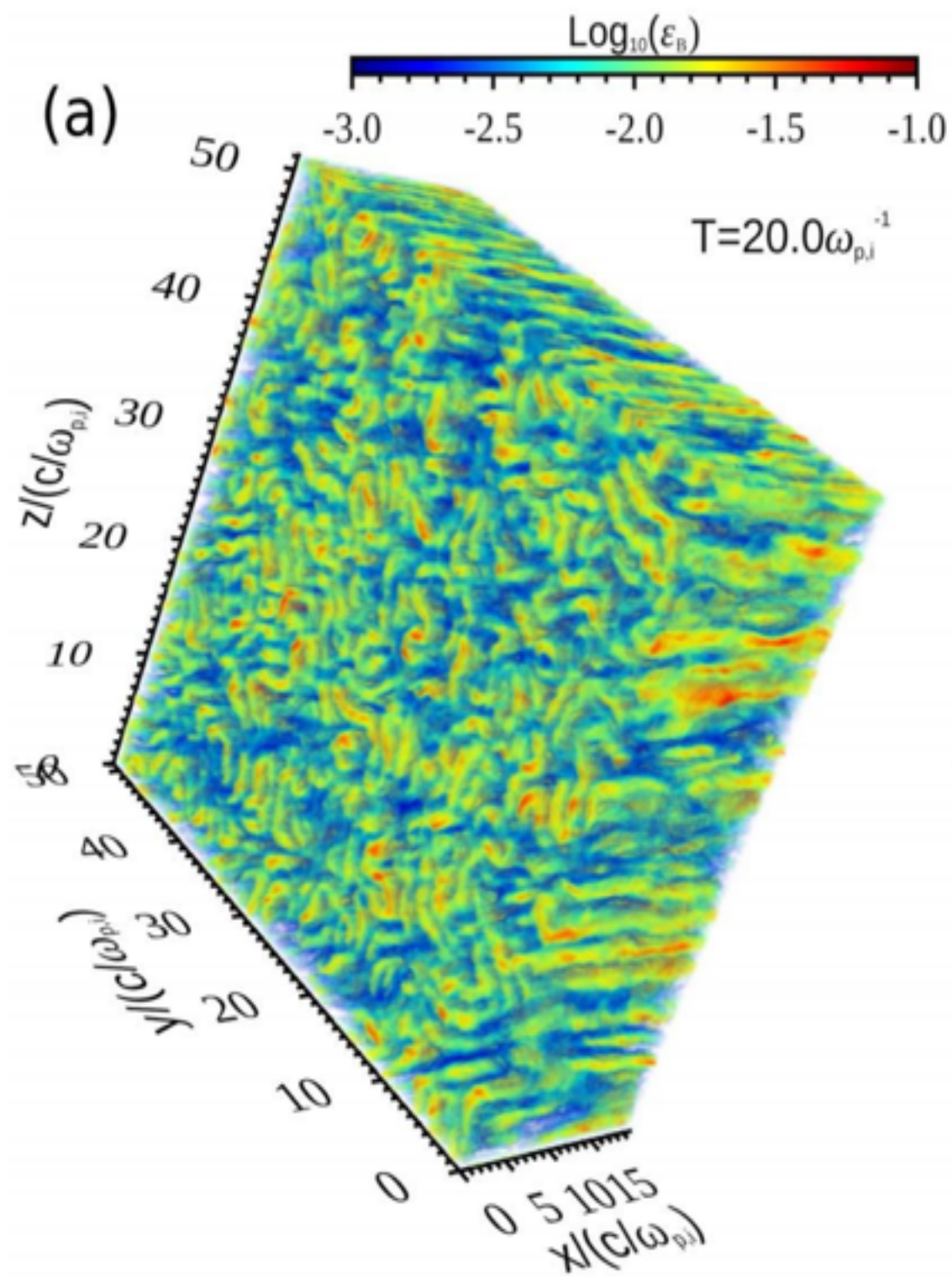






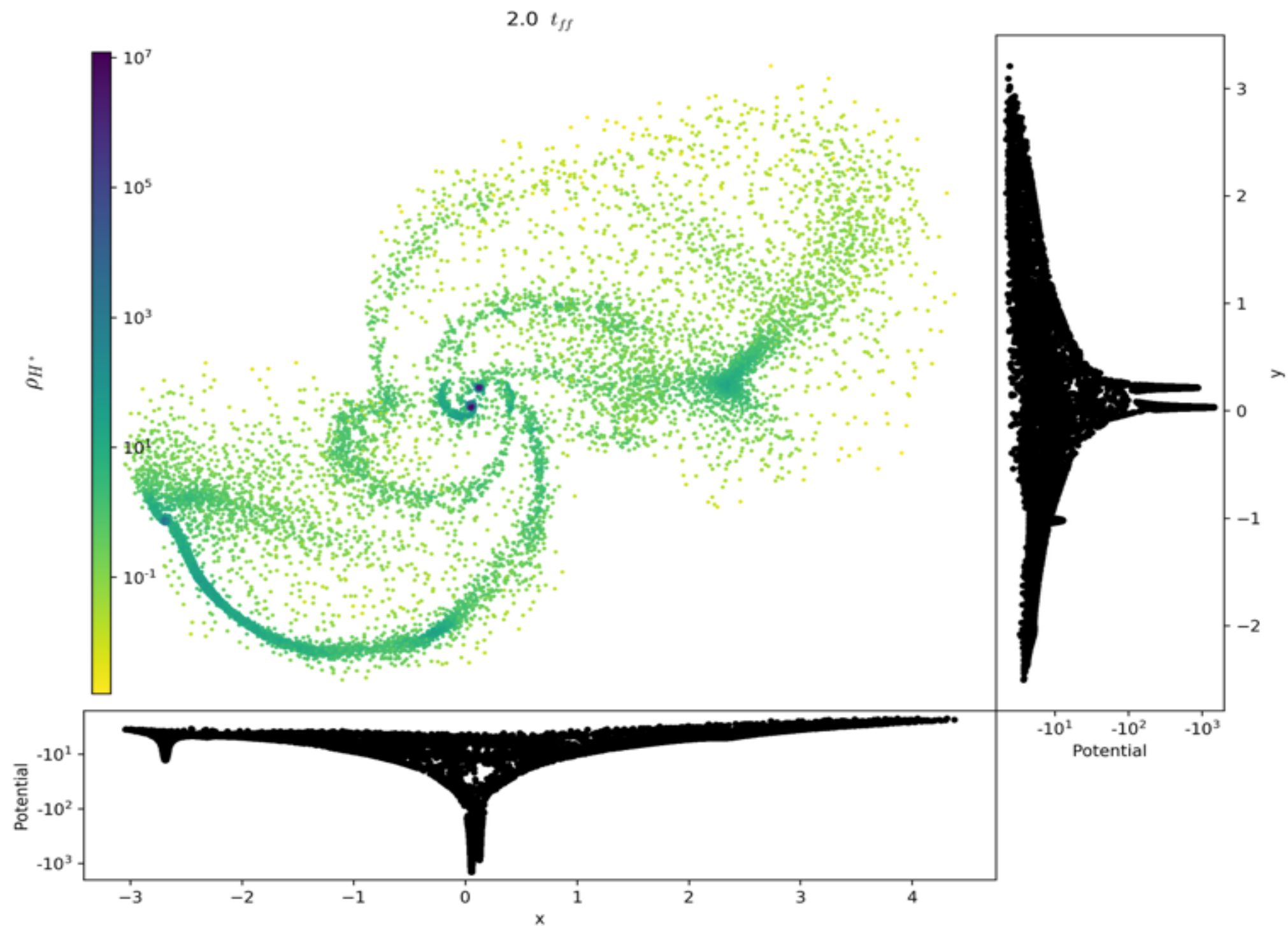






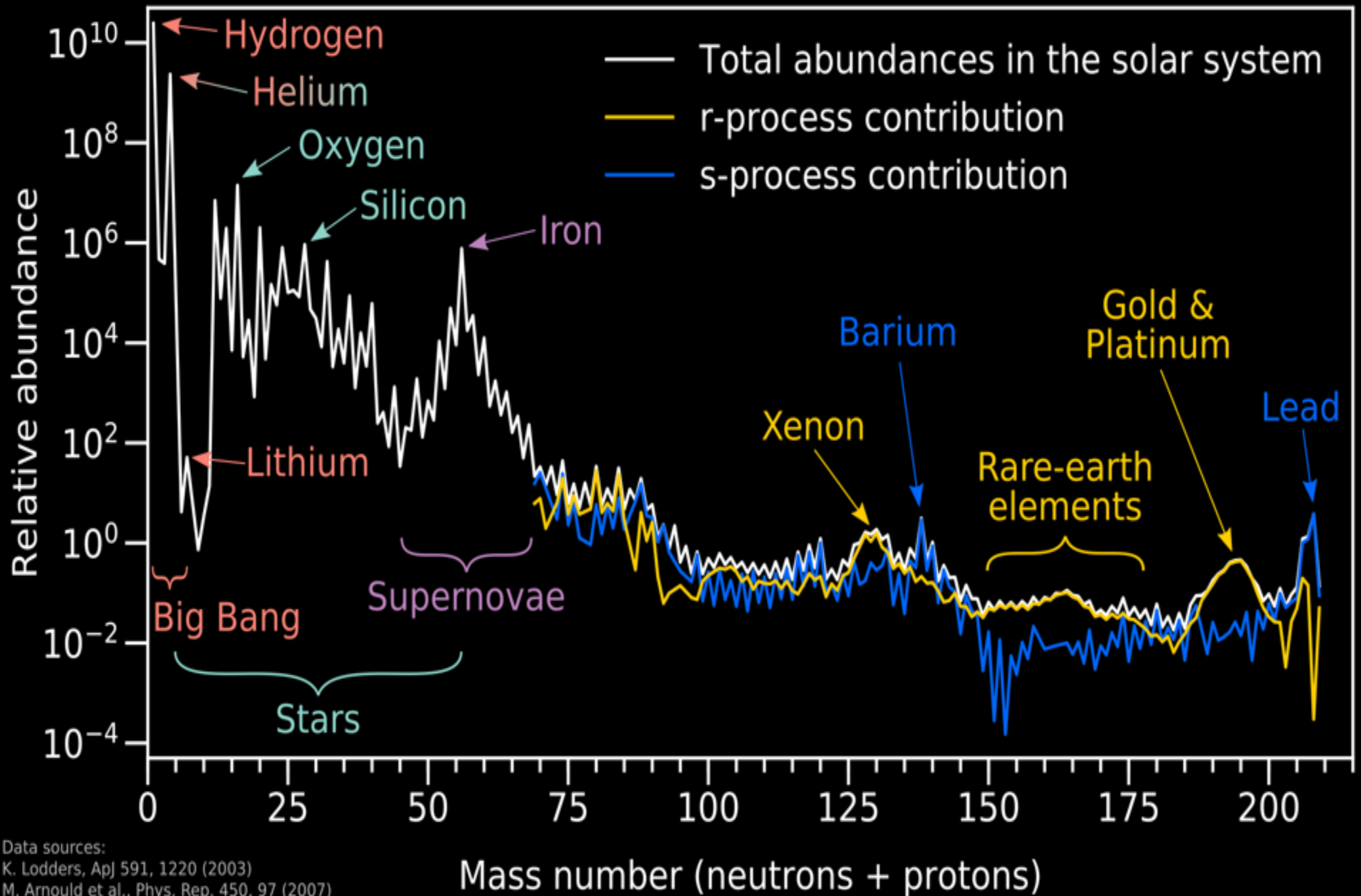
Takamoto et al. 2018





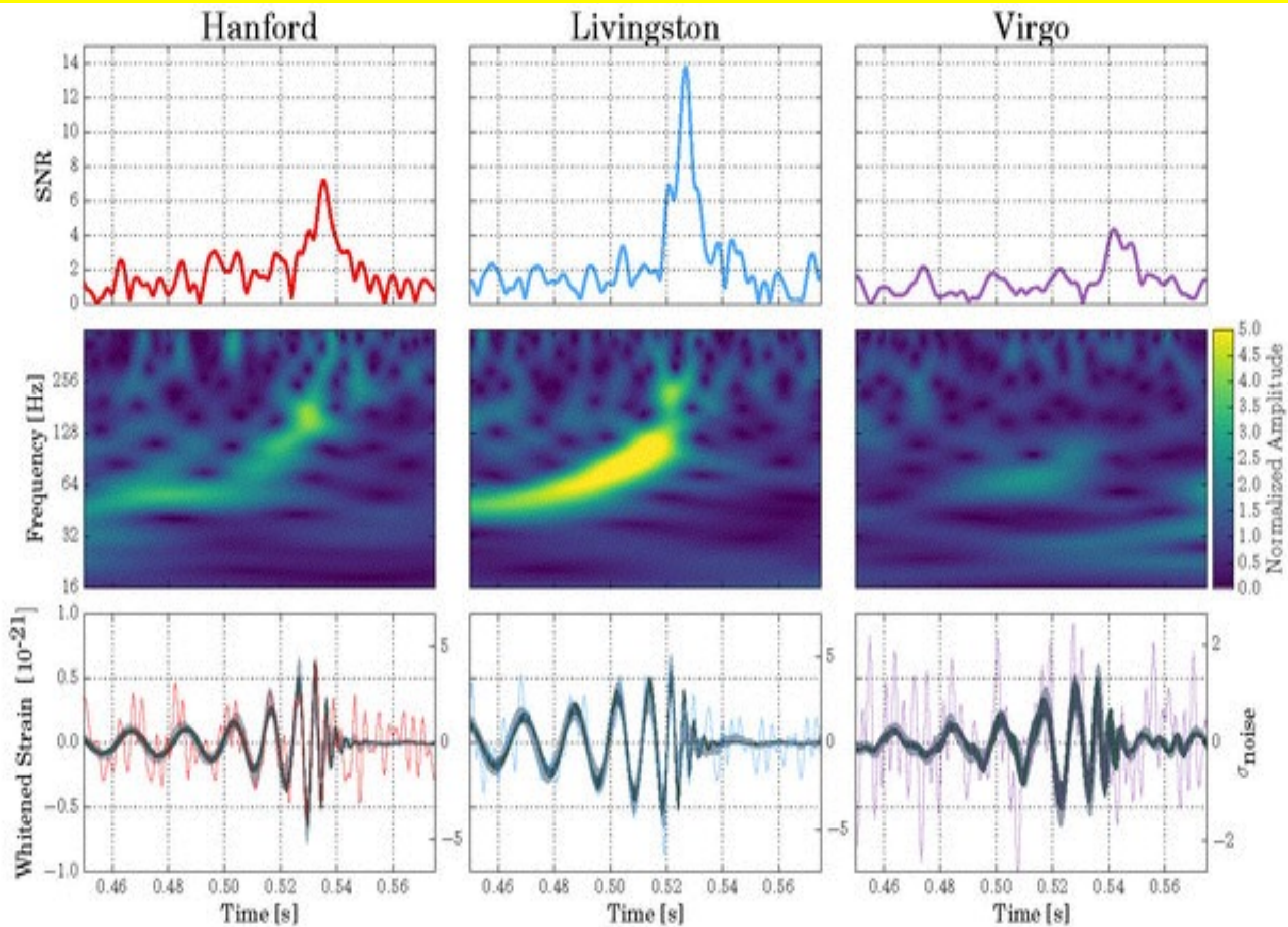
**Courtesy Brooke Polak (LANL, MPI)**





**Courtesy Jonas Lippuner**

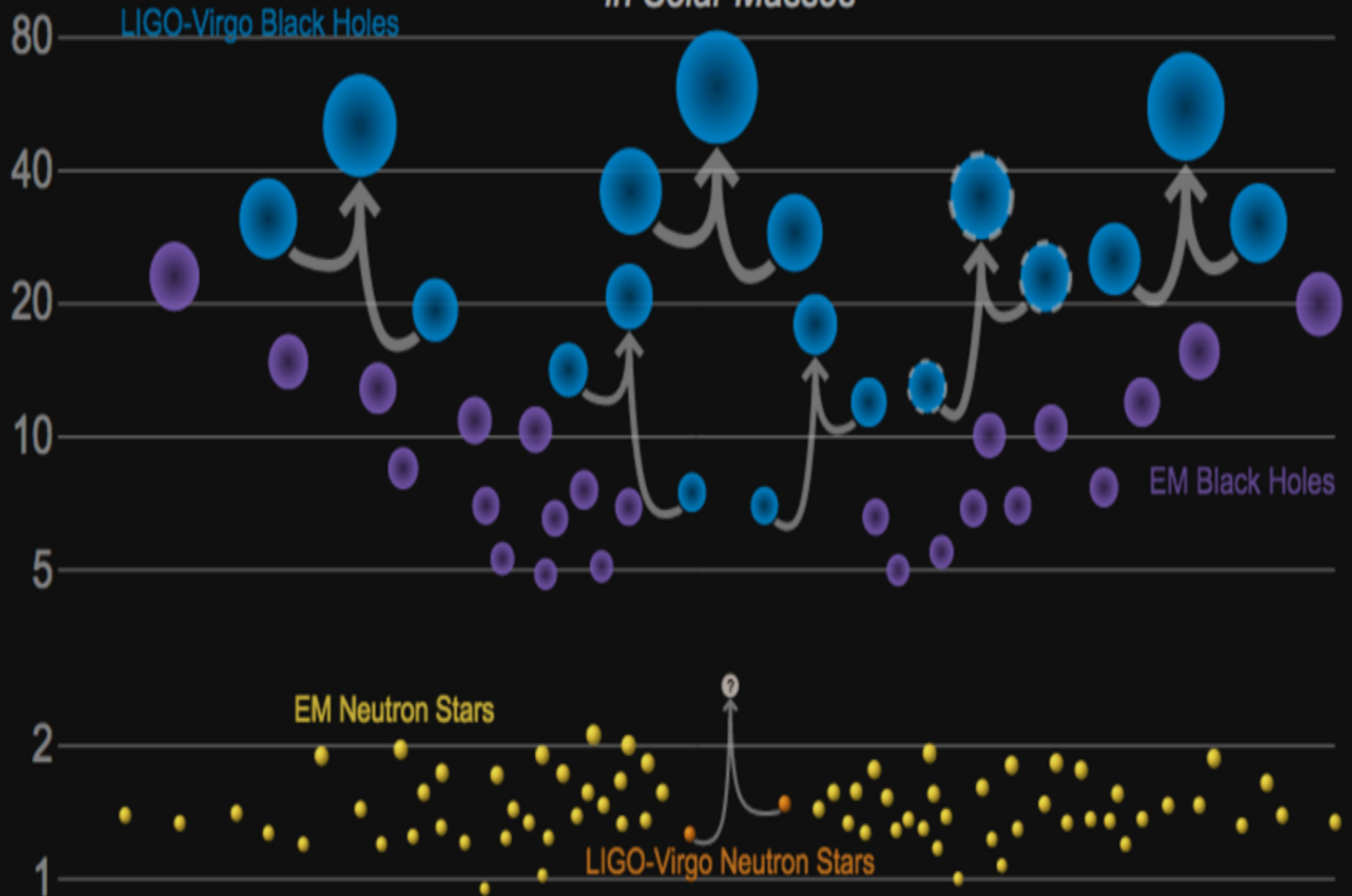






# Masses in the Stellar Graveyard

*in Solar Masses*



Courtesy LIGO, Frank Elavsky



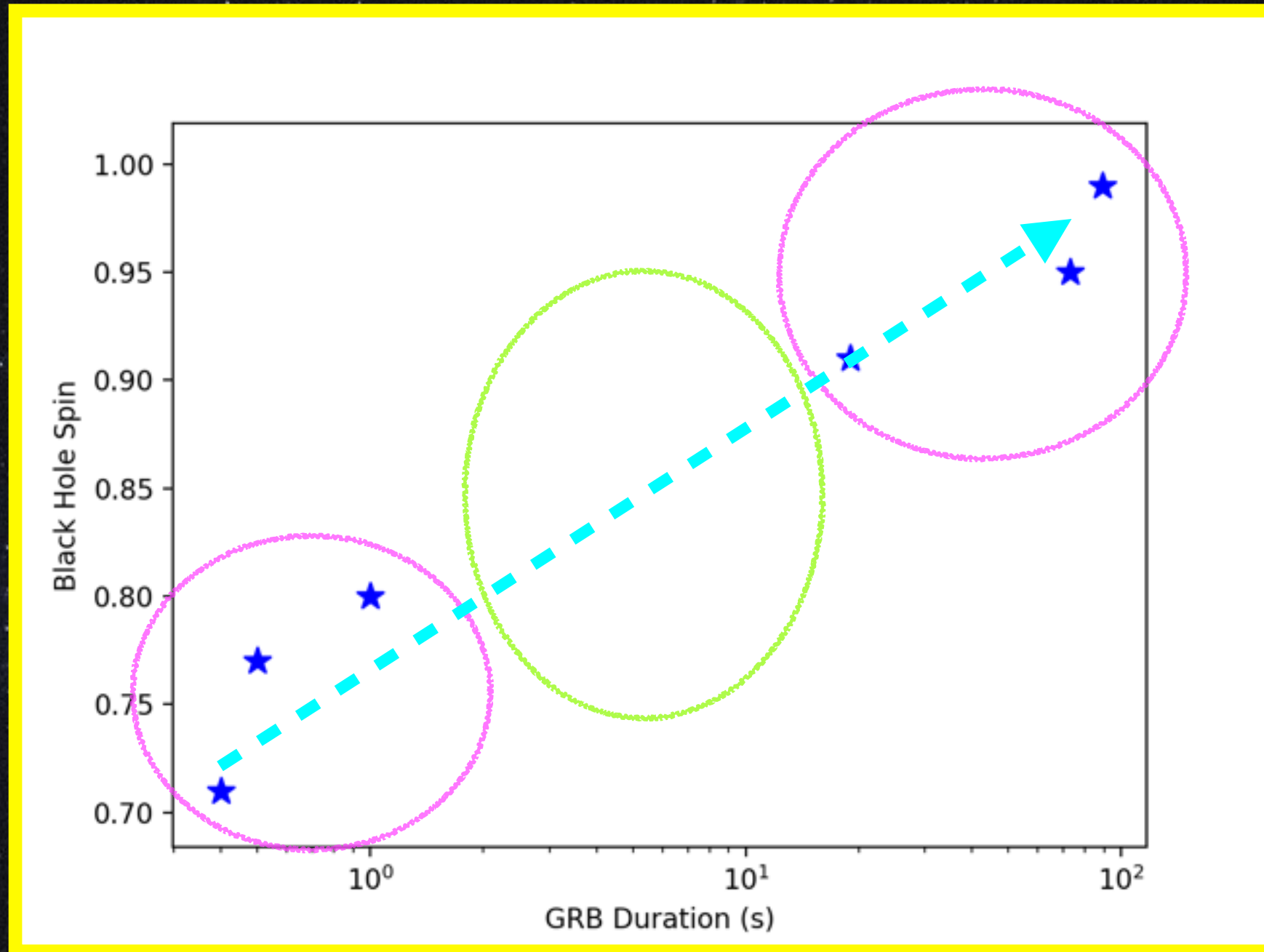
IT'S A MATTER OF  
PERSONAL TASTE,  
OF COURSE...



# FOR EXAMPLE...

<b>Black Hole Mass (solar masses)</b>	<b>Duration of EM emission (seconds)</b>	<b>Magnetic Field (Gauss)</b>	<b>Black Hole Spin</b>
<b>5</b>	<b>73.0</b>	<b><math>10^3</math></b>	<b>0.95</b>
<b>5</b>	<b>89.0</b>	<b><math>10^3</math></b>	<b>0.99</b>
<b>10</b>	<b>19.0</b>	<b><math>10^4</math></b>	<b>0.91</b>
<b>15</b>	<b>1.0</b>	<b><math>10^6</math></b>	<b>0.80</b>
<b>17</b>	<b>0.5</b>	<b><math>10^6</math></b>	<b>0.77</b>
<b>7</b>	<b>0.4</b>	<b><math>10^3</math></b>	<b>0.71</b>





YOUR POINT MAY NOT BE SIMPLE, BUT YOU CAN  
COMMUNICATE IT SIMPLY AND CLEARLY



# GIVING AN EFFECTIVE TALK TO ANY AGE GROUP OR BACKGROUND





# UNDERSTAND THE GOALS OF YOUR TALK

**Conference on Latest  
Results in  
Gravitational Wave  
Astronomy**

**TODAY I'D LIKE TO  
DISCUSS WITH YOU  
THE PHYSICS OF  
CRUNCHY CHIPS**





ARE YOU THERE TO:

CONVEY NEW RESULTS?

REPORT ON THE STATUS OF AN INSTRUMENT?

GIVE AN OVERVIEW?

KNOW WHY YOU ARE THERE!  
(AND YOU WILL BE INVITED BACK!)



# LEARN YOUR AUDIENCE

Ok class, let's discuss  
the advantages of loop  
quantum gravity over  
string theory!



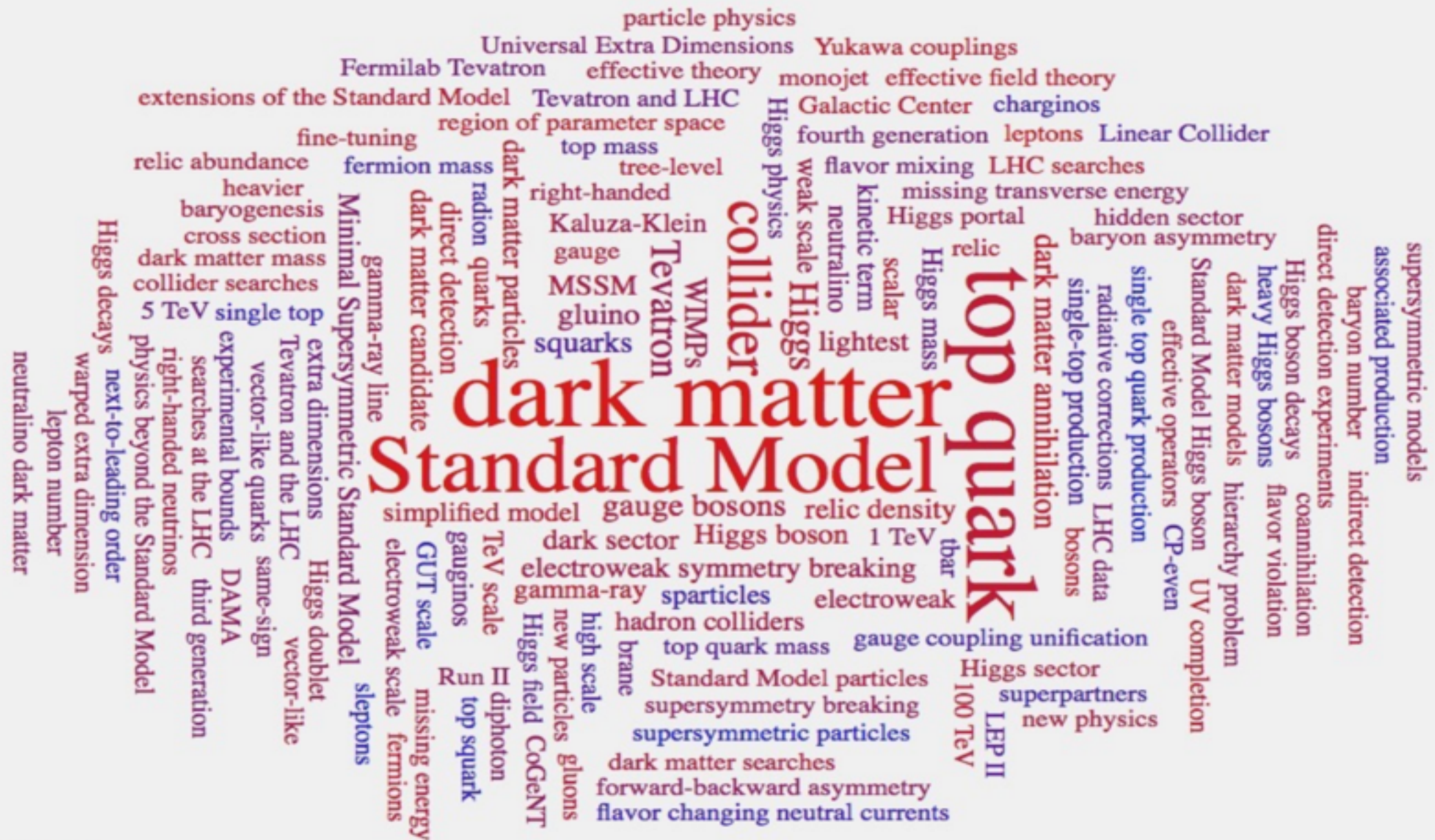


SHIFT THE FOCUS FROM CONVEYING  
YOUR POINTS TO MEETING YOUR  
AUDIENCE'S NEEDS!!

WHEN YOUR AUDIENCE IS MIXED LEVELS, AIM  
YOUR TALK AT THOSE WITH LESS BACKGROUND  
(BUT HAVE MATERIAL AVAILABLE TO GO IN  
DEPTH AS NEEDED).



# AVOID (OR DEFINE) THE JARGON!



- Recently used
- Not recently used



# REMEMBER...

LESS IS MORE – SIMPLE BUT INFORMATIVE AND VISUALLY  
APPEALING TALKS ARE WELL RECEIVED



BE HEARD! GET A MIC IF NEEDED, STAND UP TALL, LOOK  
AT EYES (FOREHEADS)

STICK TO YOUR TIME LIMIT (WE BEG YOU)



# PRACTICE!





# A NOTE ON PUBLIC OUTREACH

FOLKS ARE THERE BECAUSE THEY ARE INTERESTED!  
THE PRIMARY GOAL IS TO SUSTAIN (OR INCREASE)  
THAT, NOT CONVEY SPECIFIC INFO.

BE OK WITH LETTING GO OF YOUR  
ORIGINAL PLAN!





**SCRAP THE EM SPECTRUM - WE'RE DOING CIRCUITS INSTEAD!**



TO QUOTE DAVID SEDARIS:

“BE YOURSELF!”

(“UNLESS YOURSELF IS AN A&\$HOLE”)