What exactly is **Astronomy?**

Samuel Hinton

Credit: Josh Calcino

Hi, I'm

Samuel Hinton

@samreay

I’m an

astronomer

engineer

student

What do I do?

Observing

Travel

abc - [C:\Users\shint1\PycharmProjects\abc] - ...\dessn\snana\convert_snana_data.py - PyCharm 2017.1.1

File Edit View Navigate Code Refactor Run Tools VCS Window Help

abc > dessn > snana > convert_snana_data.py

selection_effects

Project

- old
- old2
- real_data
- real_data_larger
- validation
- __init__.py
- bulk.py
- bulk_large.py
- bulk_planck.py
- bulk_tests.py
- fakes.py
- lock.py
- lock_simple.py
- nominal.py
- nominal_comparison.py
- nominal_uncert.py
- plot_pop_simple.py
- plot_pop_snana.py
- real_data.py
- samchain.npy
- samchain.txt
- simple.py
- simple_w.py
- simple_w_array.py
- simple_w_shift.py
- validation.py
- validation_sys.py
- framework
  - models
    - stan
    - __init__.py
    - approx_model.py
    - full_model.py
    - skewness_fix.py
  - simulations

bulk.py | helper.py | nominal.py | convert_snana_data.py

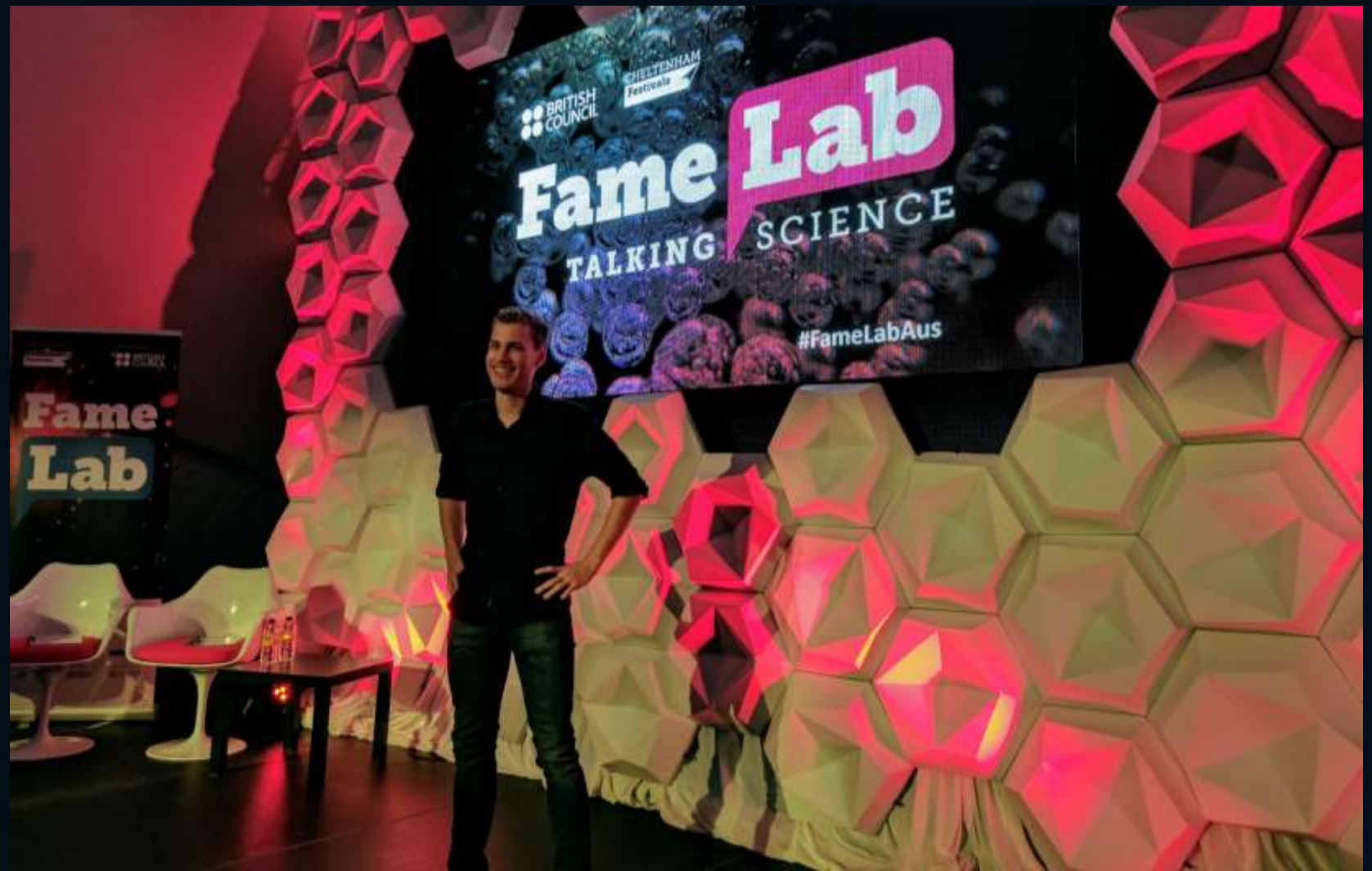
```python
# -*- coding: utf-8 -*-
"""
Created on Thu Sep 15 12:42:49 2016

@author: shint1
"""
import ...


def load_fitres(filename, skiprows=6):
    # logging.debug("Loading %s" % filename)
    if filename.endswith(".gz"):
        compression = "gzip"
    else:
        compression = None
    try:
        dataframe = pd.read_csv(filename, sep='\s+', compression=com
    except ValueError:
        logging.error("Filename %s failed to load" % filename)
        return None
    columns = ['CID', 'IDSURVEY', 'zHD', 'HOST_LOGMASS', 'HOST_LOGMA
               'x1ERR', 'c', 'cERR', 'mB', 'mBERR', 'x0', 'x0ERR',
               'COV_x1_c', 'COV_x1_x0', 'COV_c_x0', 'SIM_mB', 'SIM_x
               'biasCor_mB', 'biasCor_x1', 'biasCor_c']
    final_columns = [c for c in columns if c in dataframe.columns]
    data = dataframe[final_columns].to_records()
    return data


def is_pos_def(x):
    if not np.all(np.isfinite(x)):
        return False
    return np.all(np.linalg.eigvals(x) > 0)


def get_scaling():
    file = os.path.abspath(inspect.stack()[0][1])
    dir_name = os.path.dirname(file)
    scale_file = dir_name + os.sep + "CREATE_COV.INPUT"
    results = []
    with open(scale_file) as f:
        for line in f:
```

bulk.py

```python
import os
import logging
import socket

from dessn.framework.fitter import Fitter
from dessn.framework.models.approx_model import ApproximateModelW,
from dessn.framework.simulations.snana import SNANASimulation
from dessn.general.helper import weighted_avg_and_std

if __name__ == "__main__":
    logging.basicConfig(level=logging.DEBUG, format="[%(funcName)20s
    plot_dir = os.path.dirname(os.path.abspath(__file__)) + "/plots/
    # plot_dir = os.path.dirname(os.path.abspath(__file__)) + "/plot
    dir_name = plot_dir + "output/"
    pfn = plot_dir + os.path.basename(__file__)[:-3]

    file = os.path.abspath(__file__)

    if not os.path.exists(dir_name):
        try:
            os.makedirs(dir_name)
        except FileExistsError:
            pass

    models = [
        ApproximateModelW(prior=True, statonly=False),
        ApproximateModelW(prior=True, statonly=True)
    ]

    ndes = -1  # 204
    nlowz = -1  # 128
    simulations = [
        [SNANASimulation(ndes, "DES3YR_DES_BULK_G10_SKEW_v8", type=N
        [SNANASimulation(ndes, "DES3YR_DES_BULK_C11_SKEW_v8", type=N
    ]
    fitter = Fitter(dir_name)

    # data = models[0].get_data(simulations[0], 0, plot=False)  # Fo
    # exit()
    fitter.set_models(*models)
    fitter.set_simulations(*simulations)
    ncosmo = 100
```

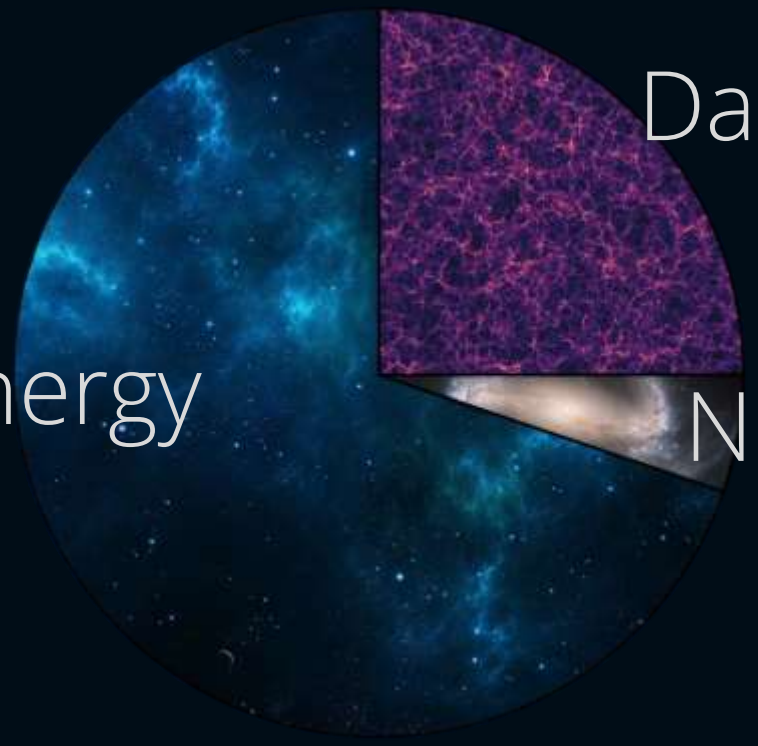
Coding

Talking


BRITISH COUNCIL
CHELTENHAM Festivals
Fame Lab
TALKING SCIENCE
#FameLabAus
Fame Lab

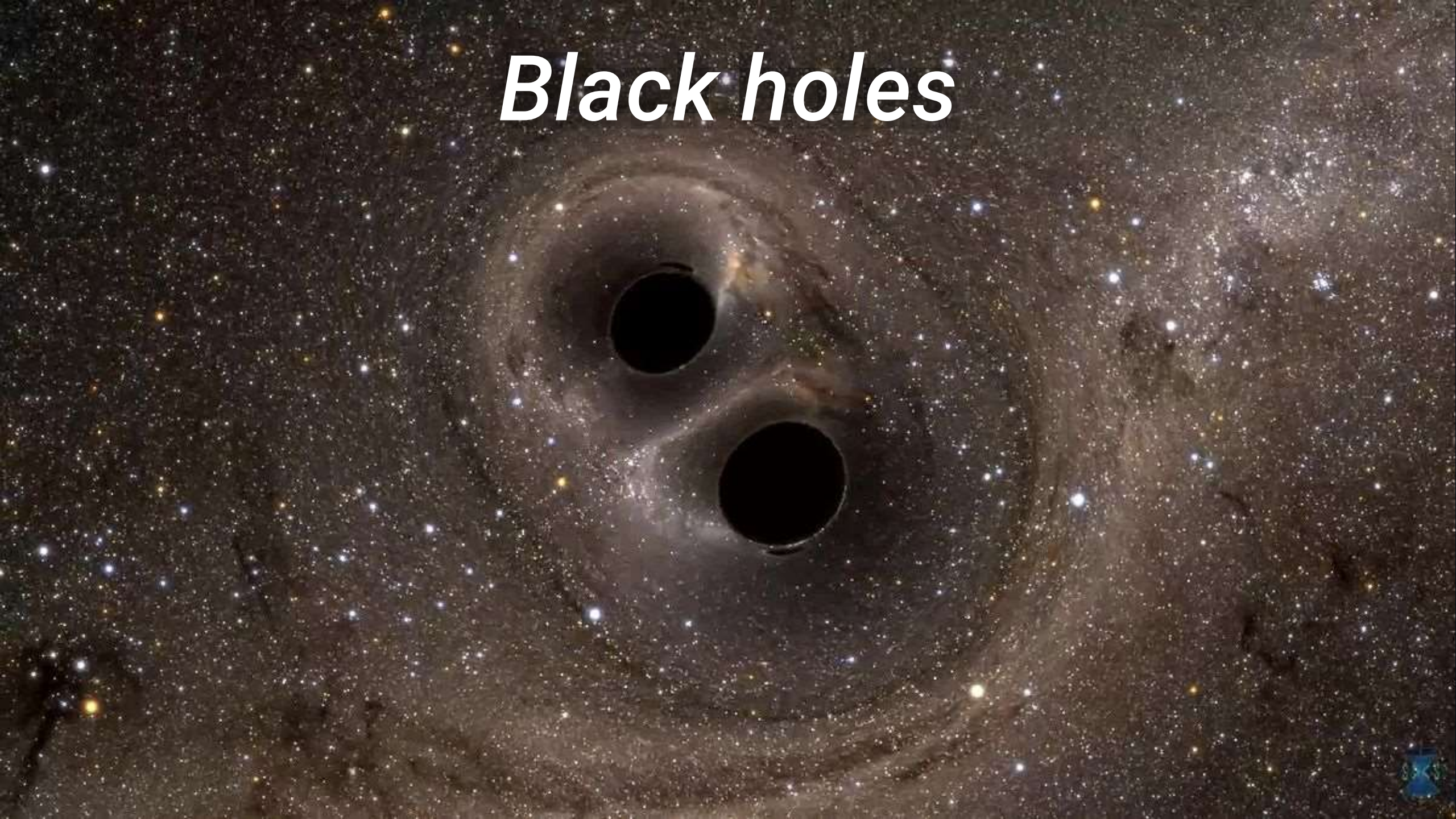
What do I look at?

Dark energy and dark matter

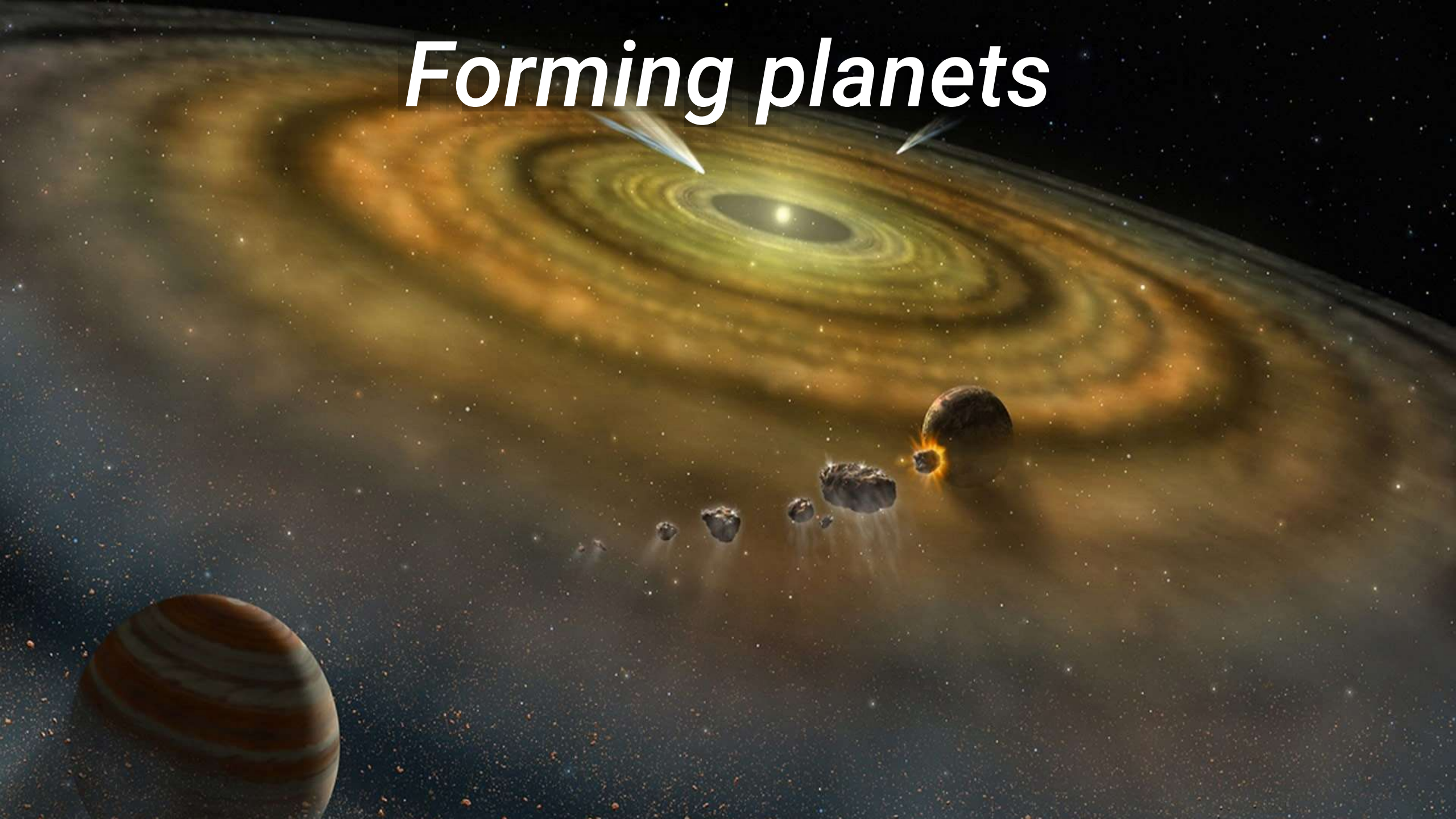


95% of the universe is ***unknown!***

Black holes



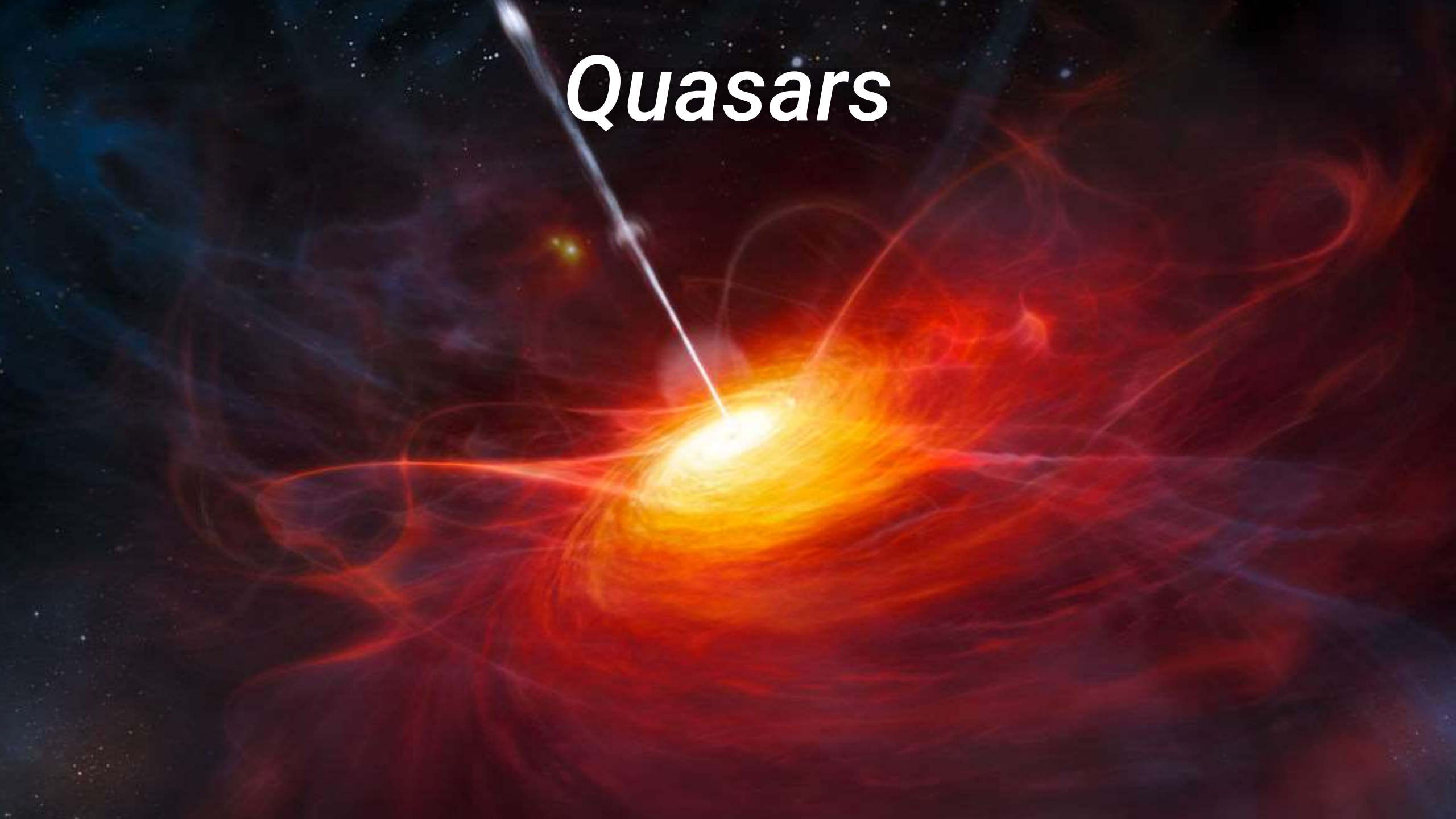
Forming planets

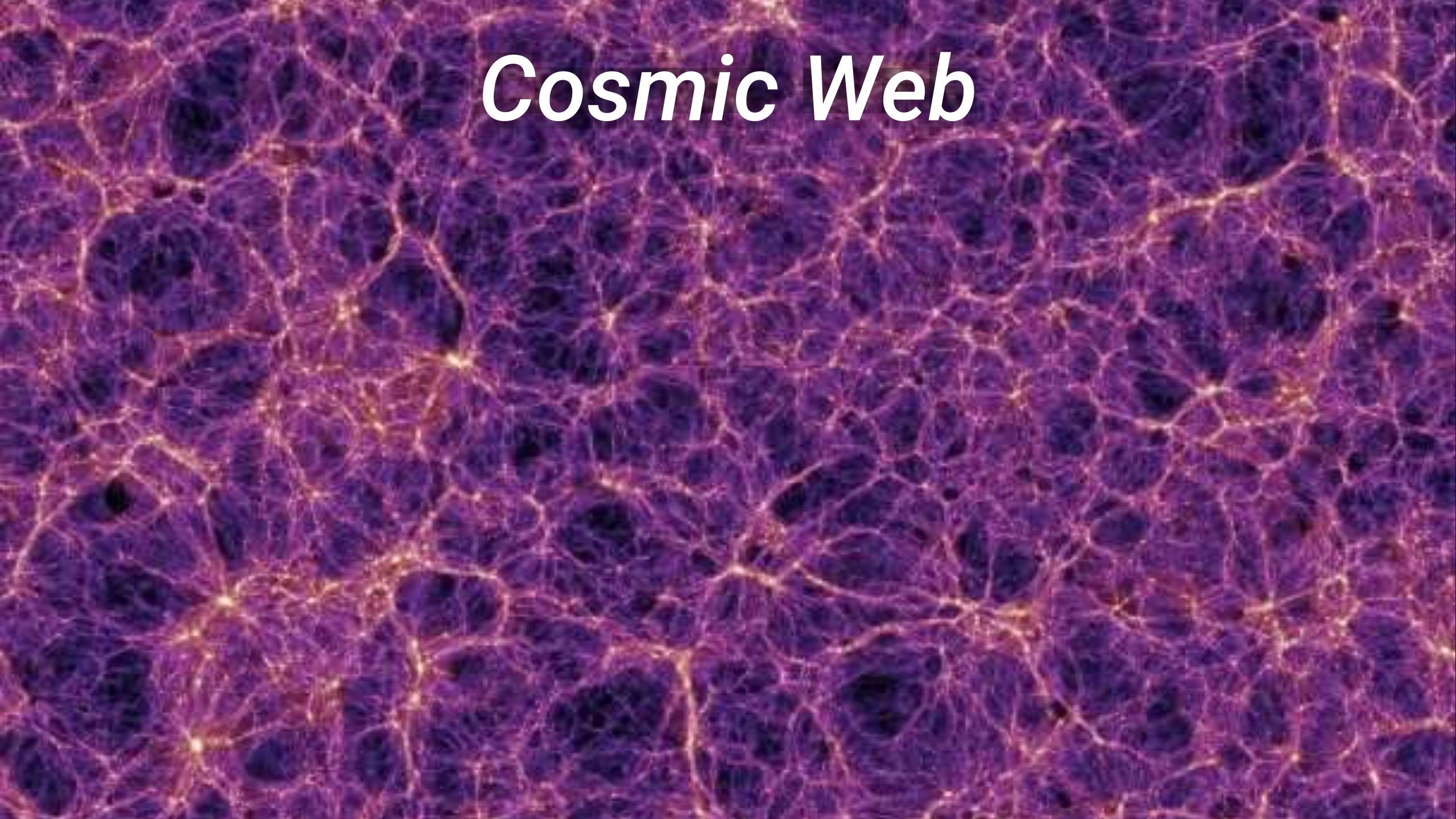


Forming stars

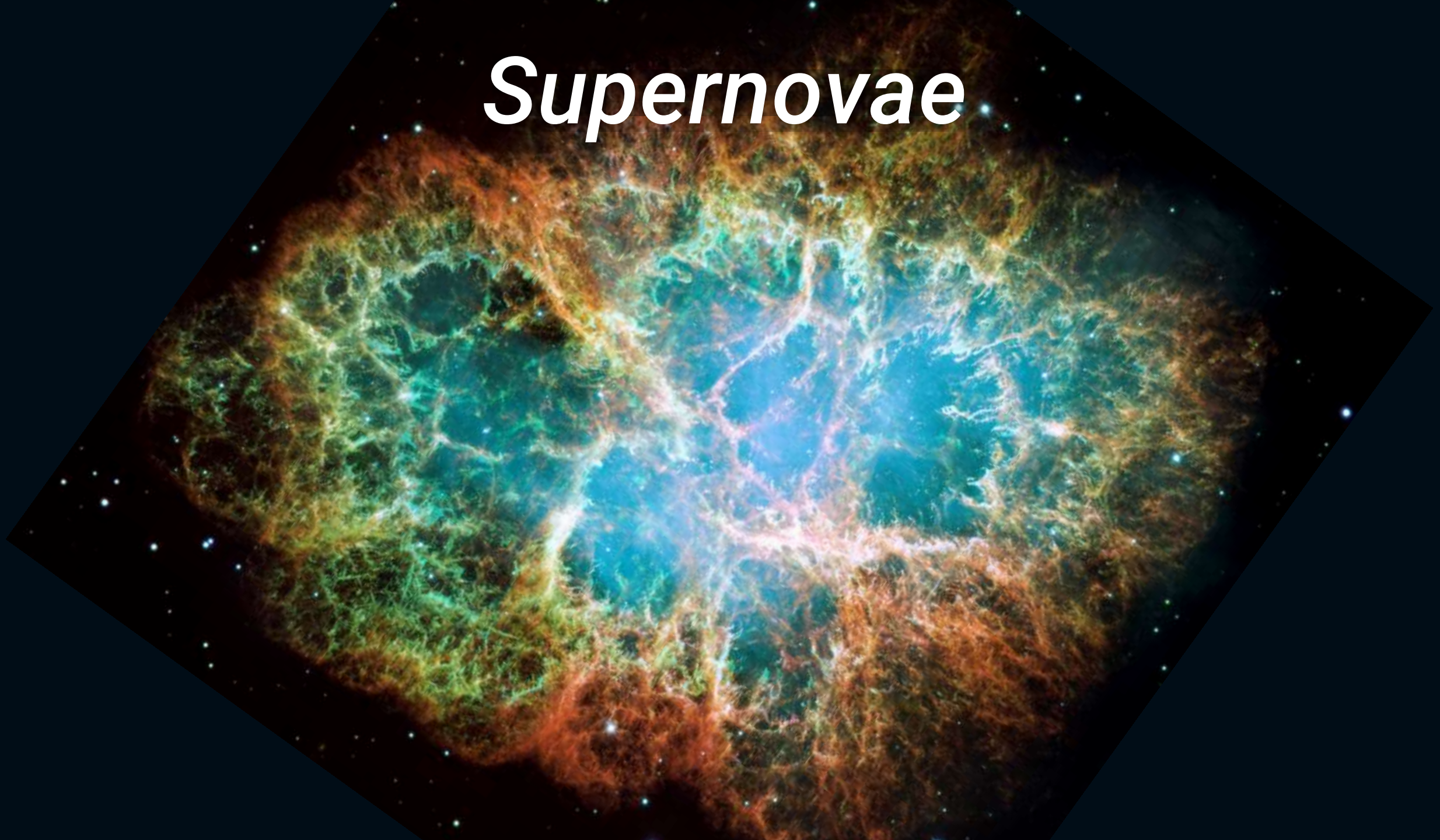
Galaxy evolution

Quasars



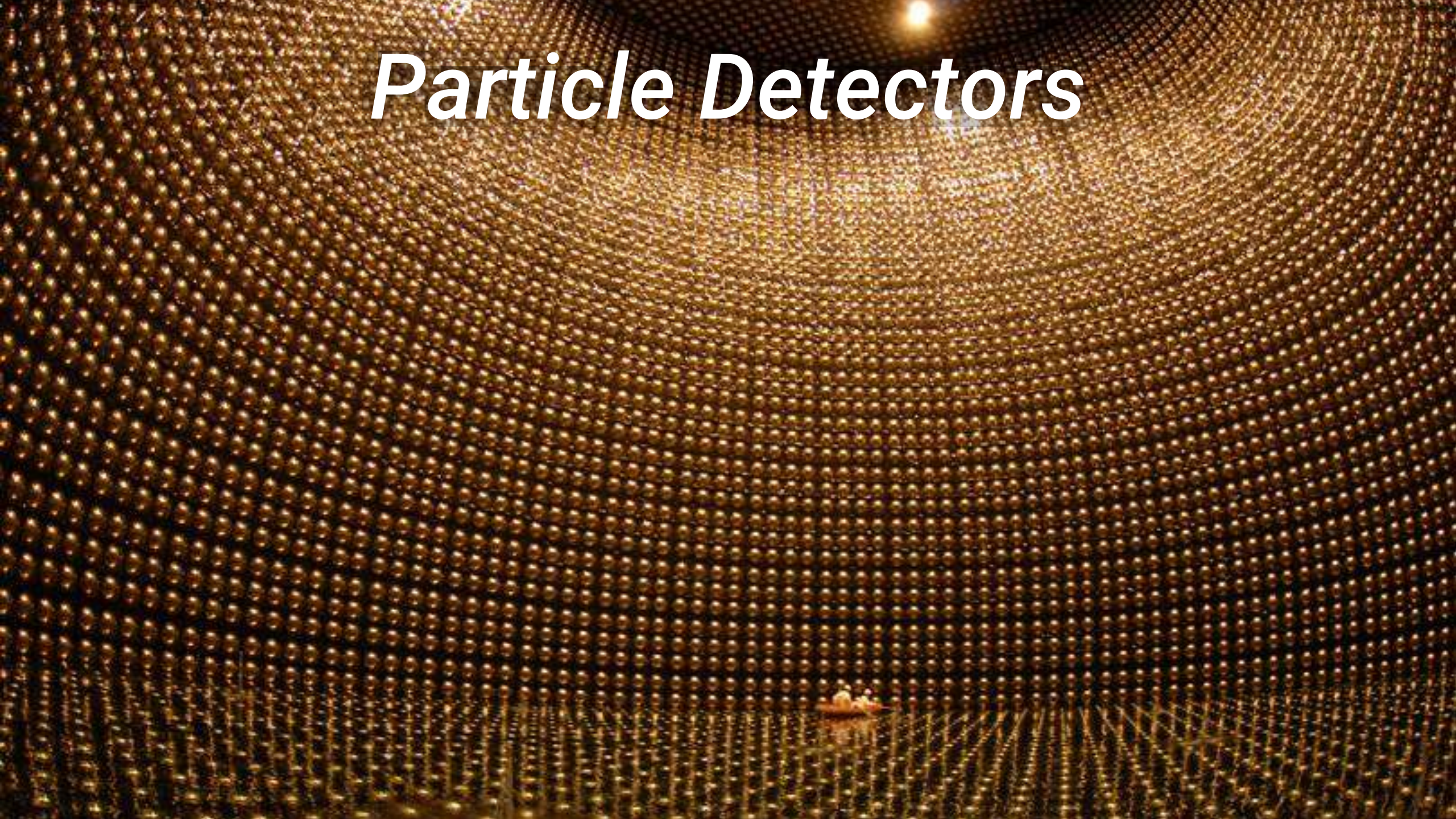

Cosmic Web

Supernovae



Lensing

Particle Detectors



Let’s test your
space facts
Credit: Michele Falzone

It rains acid on which planet:

Mercury ***Venus***

Heads **Tails**

Credit: Michele Falzone

What is at the centre of our galaxy?

Black hole

Heads

Worm hole

Tails

Credit: Michele Falzone

Which is faster?

Satellite ***Earth***

Heads **Tails**

Credit: Michele Falzone

Which takes longer?

Driving to the moon

Walking around Aus

Heads

Tails

Credit: Michele Falzone

How many moons does Jupiter have?

Less than 50

More than 50

Heads

Tails

Credit: Michele Falzone

Which is older?

Comets ***Dinosaurs***

Heads **Tails**

Credit: Michele Falzone

Which is colder?

Mars ***Venus***

Heads **Tails**

Credit: Michele Falzone

You can fit all the planets between Earth and the Moon?

True ***False***

Heads **Tails**

Credit: Michele Falzone

How thick are Saturns rings?

More than Earth

Less than Earth

Heads

Tails

Credit: Michele Falzone

Which is hotter?

Lightning Bolt

Surface of the sun

Heads

Tails

Credit: Michele Falzone

Which is bigger?

Neptune ***Uranus***

Heads **Tails**

Credit: Michele Falzone

Which is bigger?
Shooting star
A football
Heads
Tails
Credit: Michele Falzone

Stars can be giants or dwarfs. Our is:

Giant ***Dwarf***

Heads **Tails**

Credit: Michele Falzone

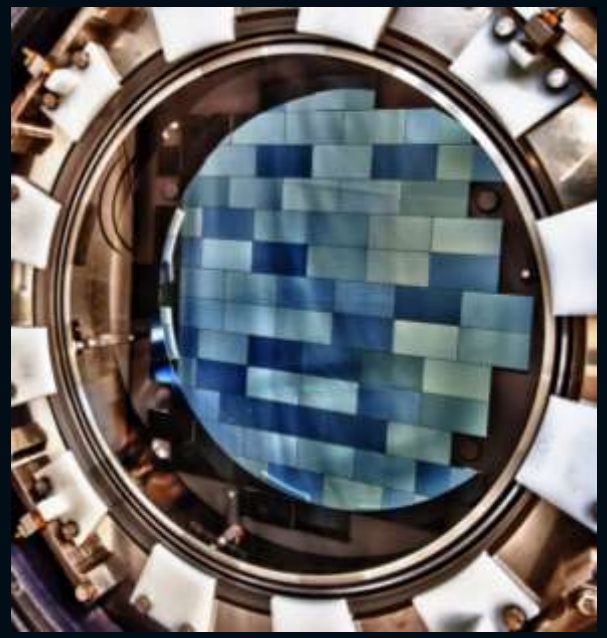
Stars can be giants or dwarfs. Our is:

Giant ***Dwarf***

Heads **Tails**

Credit: Michele Falzone

What I do for my PhD



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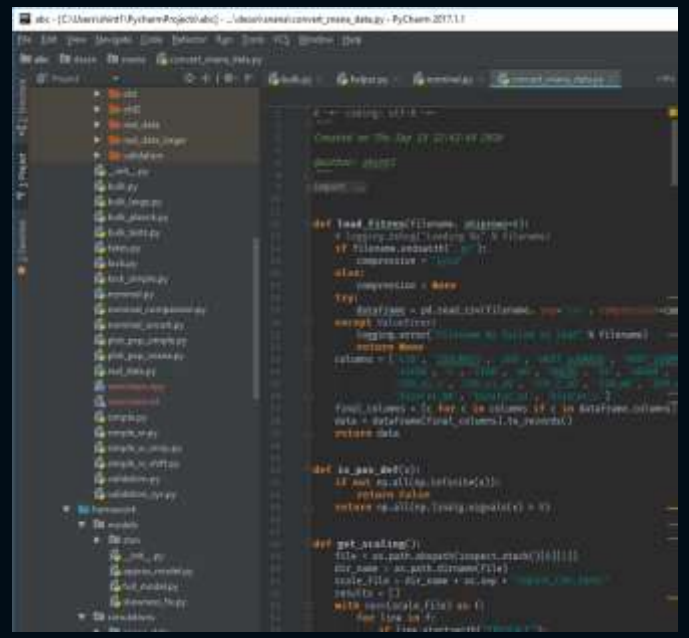
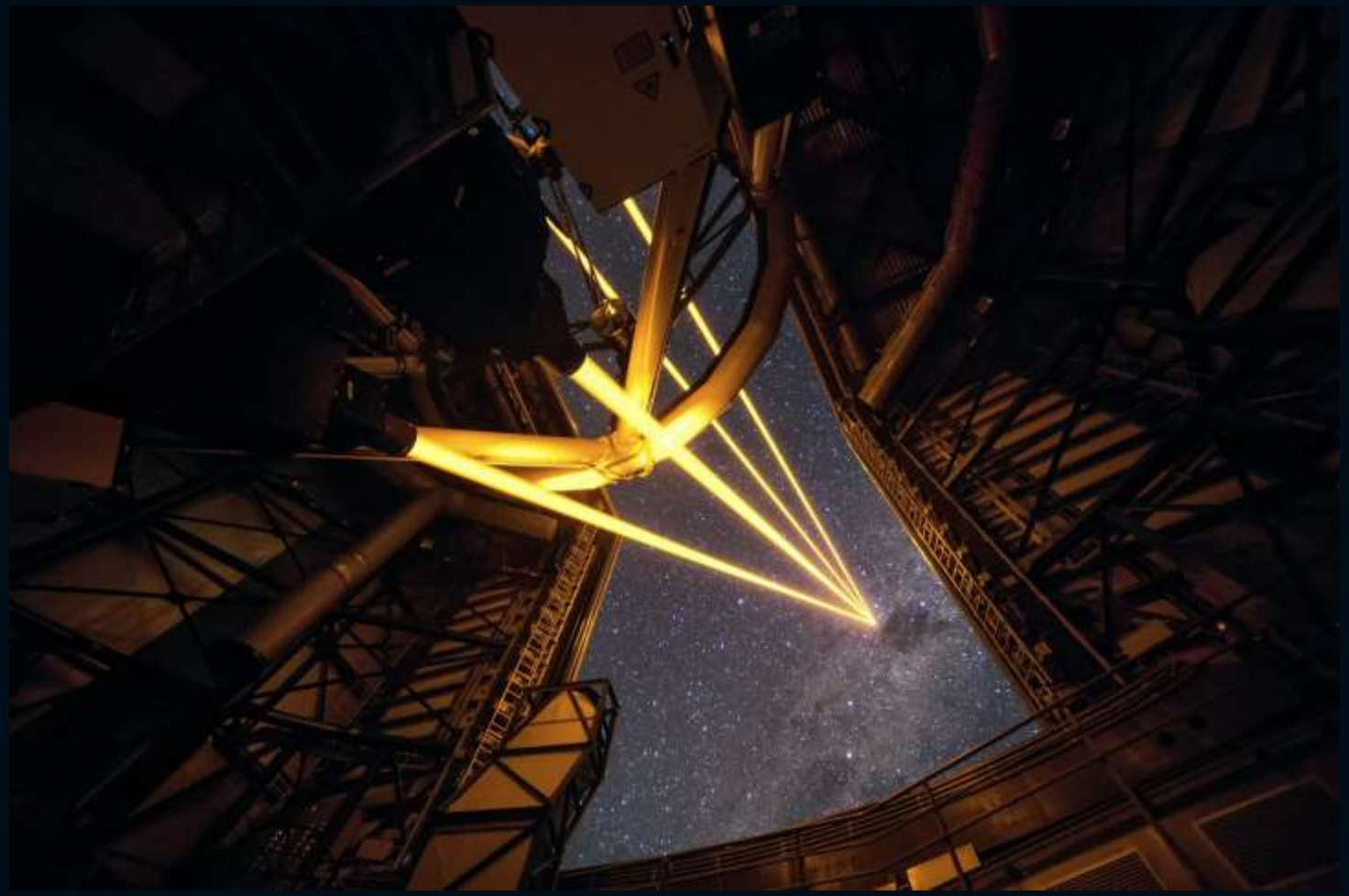


=

Use ***observations*** + lots of ***code***
to look at ***dark energy***

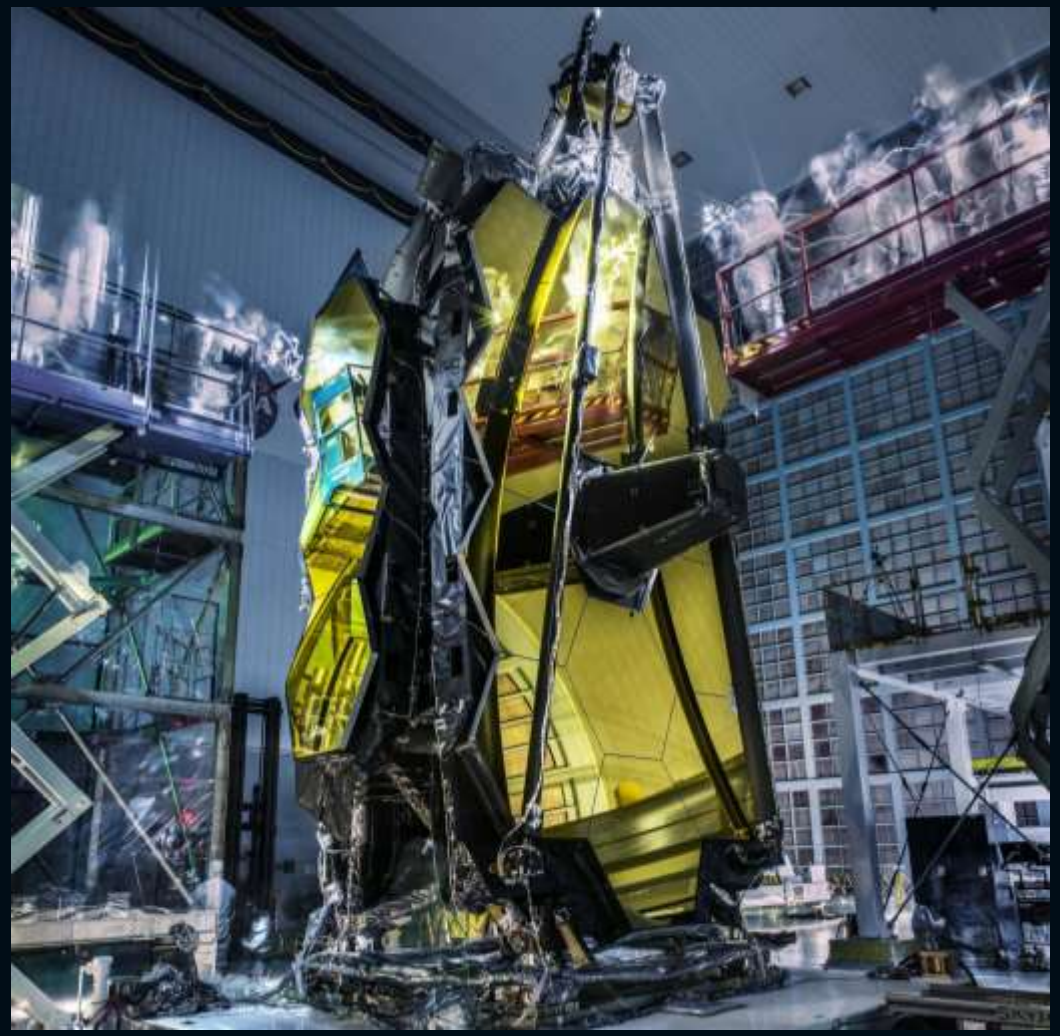
Don’t like code?



Use ***lasers*** to create fake stars!

Don’t like code?

Build
telescopes
to launch
into space!

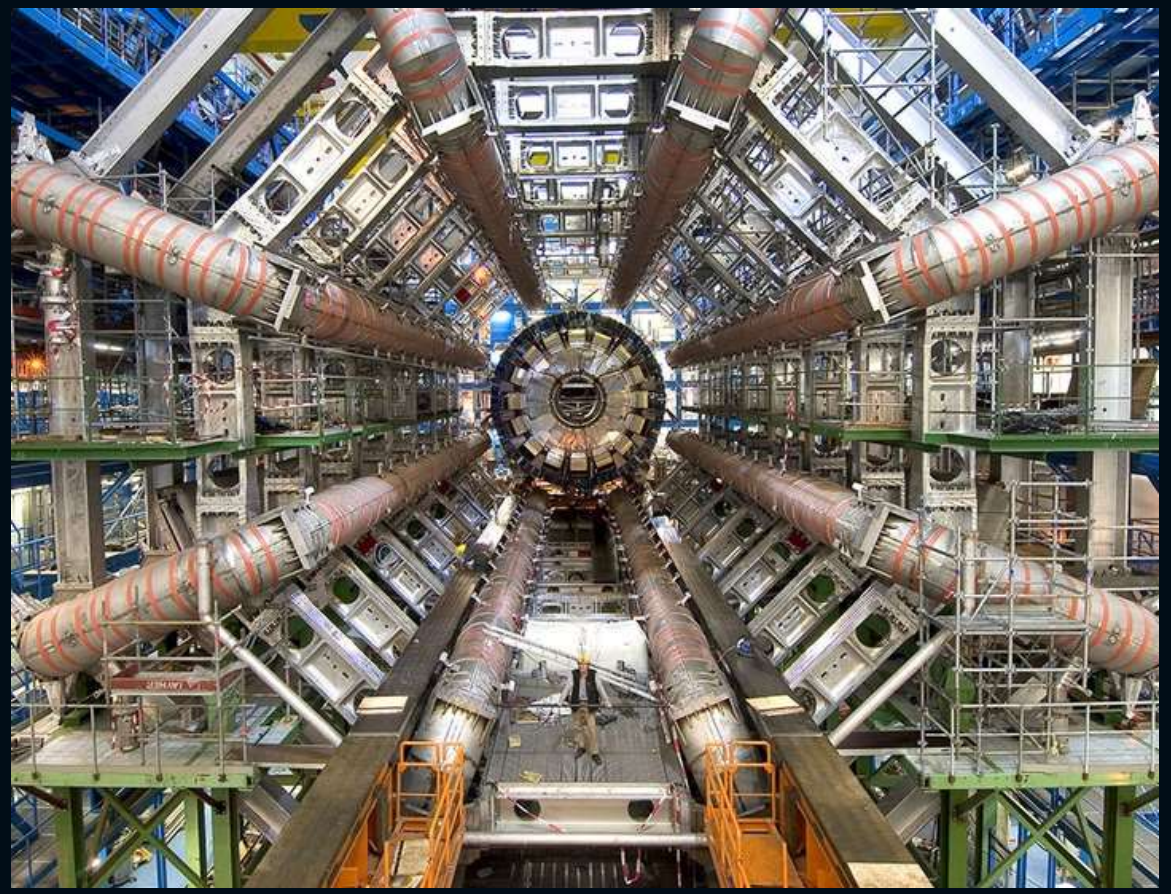


Don’t like code?

Detect
gravitational waves!

Don’t like code?

Help detect
exotic particles
by smashing
things together!



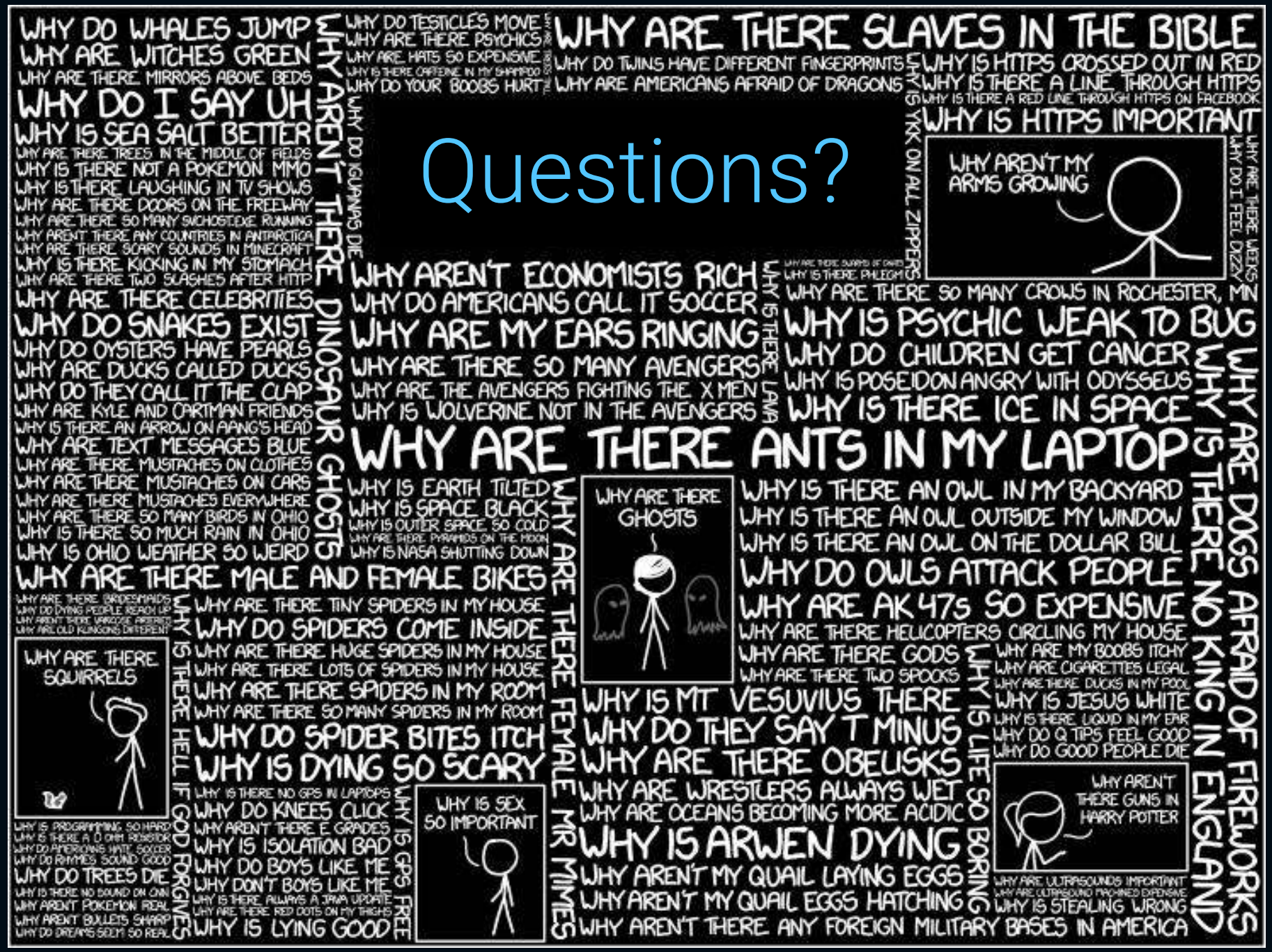
Never tried coding?

Let’s see if you can
make a ***sandwich.***

Coding sounds like fun?

Artificial intelligence.
Analysing data.
Designing websites.
Running simulations.
So much more.

Questions?


WHY DO WHALES JUMP
WHY ARE WITCHES GREEN
WHY ARE THERE MIRRORS ABOVE BEDS
WHY DO I SAY UH
WHY IS SEA SALT BETTER
WHY ARE THERE TREES IN THE MIDDLE OF FIELDS
WHY IS THERE NOT A POKEMON MMO
WHY IS THERE LAUGHING IN TV SHOWS
WHY ARE THERE DOORS ON THE FREEWAY
WHY ARE THERE SO MANY SVCHOST.EXE RUNNING
WHY AREN'T THERE ANY COUNTRIES IN ANTARCTICA
WHY ARE THERE SCARY SOUNDS IN MINECRAFT
WHY IS THERE KICKING IN MY STOMACH
WHY ARE THERE TWO SLASHES AFTER HTTP
WHY ARE THERE CELEBRITIES
WHY DO SNAKES EXIST
WHY DO OYSTERS HAVE PEARLS
WHY ARE DUCKS CALLED DUCKS
WHY DO THEY CALL IT THE CLAP
WHY ARE KYLE AND CARTMAN FRIENDS
WHY IS THERE AN ARROW ON AANG'S HEAD
WHY ARE TEXT MESSAGES BLUE
WHY ARE THERE MUSTACHES ON CLOTHES
WHY ARE THERE MUSTACHES ON CARS
WHY ARE THERE MUSTACHES EVERYWHERE
WHY ARE THERE SO MANY BIRDS IN OHIO
WHY IS THERE SO MUCH RAIN IN OHIO
WHY IS OHIO WEATHER SO WEIRD
WHY ARE THERE MALE AND FEMALE BIKES
WHY ARE THERE BRIDESMAIDS
WHY DO DYING PEOPLE REACH UP
WHY AREN'T THERE VARGOOSE AFRICA
WHY ARE OLD KINGDOMS DIFFERENT
WHY ARE THERE SQUIRRELS
WHY IS PROGRAMMING SO HARD
WHY IS THERE A 0.0MM RESISTOR
WHY DO AMERICANS HATE SOCCER
WHY DO RHYMES SOUND GOOD
WHY DO TREES DIE
WHY IS THERE NO BOUND ON CNN
WHY AREN'T POKEMON REAL
WHY AREN'T BULLETS SHARP
WHY DO DREAMS SEEM SO REAL
WHY AREN'T THERE DINOSAUR GHOSTS
WHY DO TESTICLES MOVE
WHY ARE THERE PSYCHICS
WHY ARE HATS SO EXPENSIVE
WHY IS THERE CAFFEINE IN MY SHAMPOO
WHY DO YOUR BOOBS HURT
WHY DO IGUANAS DIE
WHY ARE THERE SLAVES IN THE BIBLE
WHY DO TWINS HAVE DIFFERENT FINGERPRINTS
WHY ARE AMERICANS AFRAID OF DRAGONS
WHY IS HTTPS CROSSED OUT IN RED
WHY IS THERE A LINE THROUGH HTTPS
WHY IS THERE A RED LINE THROUGH HTTPS ON FACEBOOK
WHY IS HTTPS IMPORTANT
WHY IS YKK ON ALL ZIPPERS
WHY AREN'T MY ARMS GROWING
WHY ARE THERE WEEKS
WHY DO I FEEL DIZZY
WHY ARE THERE SWAYS IN DWEB
WHY IS THERE PHLEGM
WHY ARE THERE SO MANY CROWS IN ROCHESTER, MN
WHY AREN'T ECONOMISTS RICH
WHY DO AMERICANS CALL IT SOCCER
WHY ARE MY EARS RINGING
WHY ARE THERE SO MANY AVENGERS
WHY ARE THE AVENGERS FIGHTING THE X MEN
WHY IS WOLVERINE NOT IN THE AVENGERS
WHY IS THERE LAVA
WHY IS PSYCHIC WEAK TO BUG
WHY DO CHILDREN GET CANCER
WHY IS POSEIDON ANGRY WITH ODYSSEUS
WHY IS THERE ICE IN SPACE
WHY ARE DOGS AFRAID OF FIREWORKS
WHY ARE THERE ANTS IN MY LAPTOP
WHY IS EARTH TILTED
WHY IS SPACE BLACK
WHY IS OUTER SPACE SO COLD
WHY ARE THERE PYRAMIDS ON THE MOON
WHY IS NASA SHUTTING DOWN
WHY ARE THERE GHOSTS
WHY IS THERE AN OWL IN MY BACKYARD
WHY IS THERE AN OWL OUTSIDE MY WINDOW
WHY IS THERE AN OWL ON THE DOLLAR BILL
WHY DO OWLS ATTACK PEOPLE
WHY ARE AK 47s SO EXPENSIVE
WHY ARE THERE HELICOPTERS CIRCLING MY HOUSE
WHY ARE THERE GODS
WHY ARE THERE TWO SPOOKS
WHY IS THERE NO KING IN ENGLAND
WHY ARE THERE TINY SPIDERS IN MY HOUSE
WHY DO SPIDERS COME INSIDE
WHY ARE THERE HUGE SPIDERS IN MY HOUSE
WHY ARE THERE LOTS OF SPIDERS IN MY HOUSE
WHY ARE THERE SPIDERS IN MY ROOM
WHY ARE THERE SO MANY SPIDERS IN MY ROOM
WHY DO SPIDER BITES ITCH
WHY IS DYING SO SCARY
WHY IS THERE HELL IF GOD FORGIVES
WHY IS THERE NO GPS IN LAPTOPS
WHY DO KNEES CLICK
WHY AREN'T THERE E GRADES
WHY IS ISOLATION BAD
WHY DO BOYS LIKE ME
WHY DON'T BOYS LIKE ME
WHY IS THERE ALWAYS A JAVA UPDATE
WHY ARE THERE RED DOTS ON MY THIGHS
WHY IS LYING GOOD
WHY IS SEX SO IMPORTANT
WHY IS GPS FREE
WHY ARE THERE FEMALE MR MIMES
WHY IS MT VESUVIUS THERE
WHY DO THEY SAY T MINUS
WHY ARE THERE OBELISKS
WHY ARE WRESTLERS ALWAYS WET
WHY ARE OCEANS BECOMING MORE ACIDIC
WHY IS ARWEN DYING
WHY AREN'T MY QUAIL LAYING EGGS
WHY AREN'T MY QUAIL EGGS HATCHING
WHY AREN'T THERE ANY FOREIGN MILITARY BASES IN AMERICA
WHY IS LIFE SO BORING
WHY ARE MY BOOBS ITCHY
WHY ARE CIGARETTES LEGAL
WHY ARE THERE DUCKS IN MY POOL
WHY IS JESUS WHITE
WHY IS THERE LIQUID IN MY EAR
WHY DO Q TIPS FEEL GOOD
WHY DO GOOD PEOPLE DIE
WHY AREN'T THERE GUNS IN HARRY POTTER
WHY ARE ULTRASOUNDS IMPORTANT
WHY ARE ULTRASOUND MACHINES EXPENSIVE
WHY IS STEALING WRONG