

# Probing QCD in Astrophysics & Cosmology

---

Theo Motta, Philipp Klose, Ahmed Ayad

March 22, 2024 | CRC Retreat

## Project

- 100% Discussion based
- Encourage students to ask questions
- Separate sessions by topics
  - Dark Matter
  - Neutron Stars
  - Gravitational Waves

What did we talk about?

What did we talk about?

- String Theory....

What did we talk about?

- String Theory....
- Loop Quantum Gravity....

## What did we talk about?

- String Theory....
- Loop Quantum Gravity....
- Q: Why are PBH dark matter candidates?  
Where would they come from?

## What did we talk about?

- String Theory....
- Loop Quantum Gravity....
- Q: Why are PBH dark matter candidates?  
Where would they come from?
- Q: How can we measure a boson star?  
Can the boson star have a light ring?

What did we talk about?



What did we talk about?

- What's BBN?.....

## What did we talk about?

- What's BBN?.....
- Q: What's exactly the CSC phase?  
What's a diquark condensate?

## What did we talk about?

- What's BBN?.....
- Q: What's exactly the CSC phase?  
What's a diquark condensate?
- Q: What's up with Axions and Magnetars?  
*Must* an ALP couple to the photons?

What did we talk about?

What did we talk about?

- Q: How does a cosmological PT cause GWs?

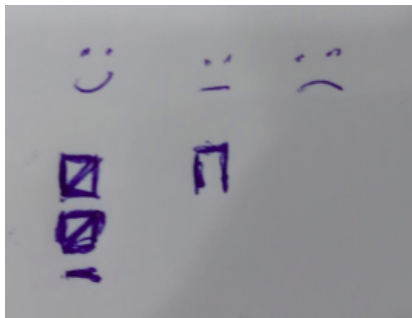
## What did we talk about?

- Q: How does a cosmological PT cause GWs?
- Q: What happens when two dark matter stars “collide”?

## What did we talk about?

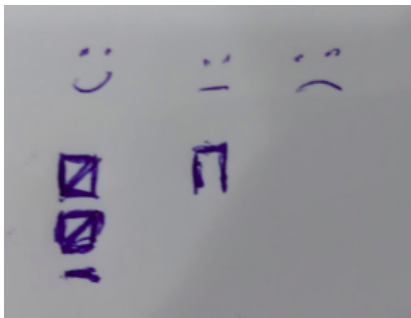
- Q: How does a cosmological PT cause GWs?
- Q: What happens when two dark matter stars “collide”?
- Q: How could a boson star be formed?

# Student Feedback



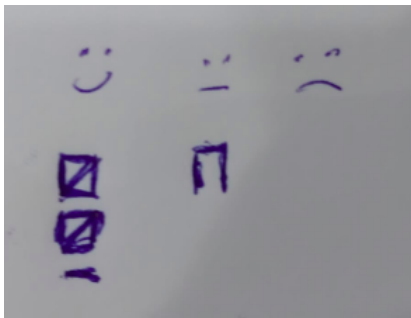


# Student Feedback



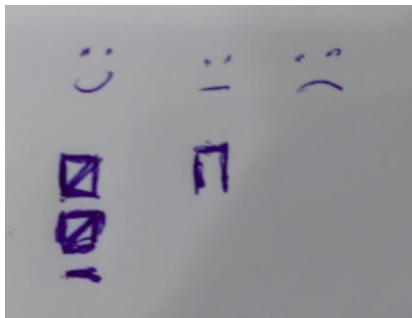
11 happy faces. Words like “fun”, “relaxing”, “enjoyable”, etc.

# Student Feedback



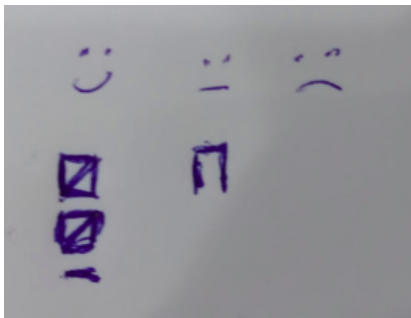
Going outside was great!

# Student Feedback



Better than regular talk. Learnt more!!!

# Student Feedback



Gets exhausting for 2h

If you try this radical format, know this:

If you try this radical format, know this:

- Moderating this discussion is a delicate business

If you try this radical format, know this:

- Moderating this discussion is a delicate business
- People did enjoy the freedom, but also missed a little bit of structure

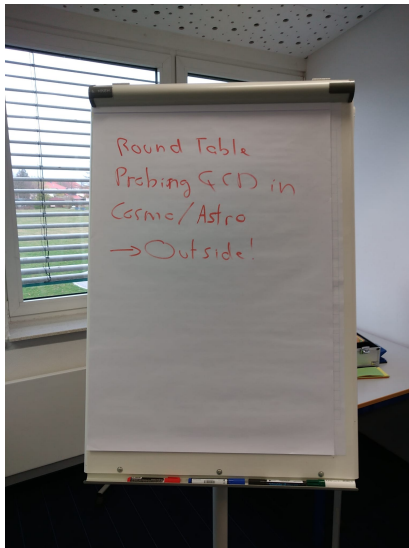
If you try this radical format, know this:

- Moderating this discussion is a delicate business
- People did enjoy the freedom, but also missed a little bit of structure
- People missed visuals!



### If you try this radical format, know this:

- Moderating this discussion is a delicate business
- People did enjoy the freedom, but also missed a little bit of structure
- People missed visuals!
- 2h is too much...



Thanks