

# Group project introduction

## Let's find new physics

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# Introduction

- Ever since the discovery of the Higgs there's been a lot of cautious excitement and little actual excitement, let's try to change that!
- Together with your group, you'll choose one of the challenges particle physics currently faces and propose a solution on how to find it.
- The results will be presented on Friday in a 10+5 format (10 min presentations, 5 min questions/discussion)
  - You can either choose a speaker in the group or present one part of the project each.
  - Working as a team is vital for particle physicists, make sure everyone is involved and you communicate your findings!

# Presentations

- A common format would be to present what-why-how\*

What

Why

How

\* these are only suggestions, feel free to put a twist in your projects!

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What

Why

What's your new physics of choice and why is it a challenge in particle physics?

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Why

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SUSY	Lepton flavour universality (LHCb tension)	Sterile neutrinos	Neutrino CP mixing angle	Many more!
Dark Matter	Matter-antimatter asymmetry	Neutrino mass hierarchy	Neutrino-less double beta decay	

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How

How would you detect it?

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## How

How would you detect it?

How does it manifest in a detector?

What have been the challenges so far to detect it?

Do we need higher energy in our colliders? How would we achieve it?

What components do we need to see it?

Does any experiment already exist trying to look for it? How would you improve it?

# Preparation

- Tomorrow afternoon will be entirely dedicated to prepare the projects.
- You will have time to research your choice, think of how to detect it and prepare a short presentation.
- You will work in breakout rooms, but we will be around in the main room in case you need any help!
- It would probably be helpful to start thinking ahead on what you may want to investigate so tomorrow you can directly dive into research!
  - You can create private rooms in Slack to communicate with your teams!



# Research tips

- Wikipedia references make for a great starting point
  - Articles themselves may be a bit basic or don't contain all the information you need, but they usually reference actual articles/papers/journals.
- Chain references
  - You may find yourself looking at an article that takes for granted something explained in its bibliography, feel free to dig into its references too, but...
- Beware of rabbit holes
  - Citations may go into an infinite loop, make sure you stay focus on what you want to research!

Thanks for your attention!