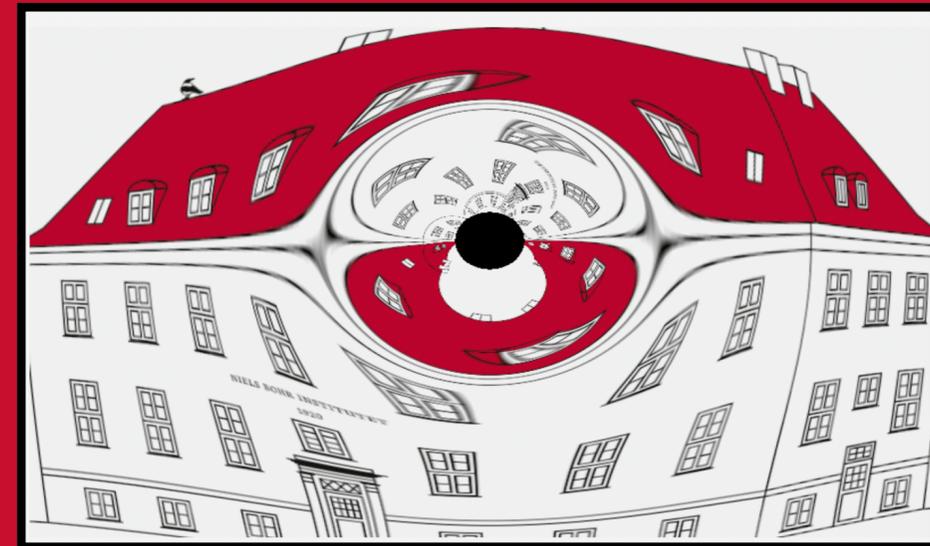


Research @ strong-gr

MSc day 2024

8th October

Niels Bohr International Academy



strong-gr.com



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niels bohr
institute

Members@NBI:

-Principal Investigator: 1

-Faculty: 2

-Assistant Professors: 2

-Postdocs: 9

-Ph.D students: 10

-Other associates, visitors, MSc, BSc...

Maarten van de Meent



José Ezquiaga



Vitor Cardoso

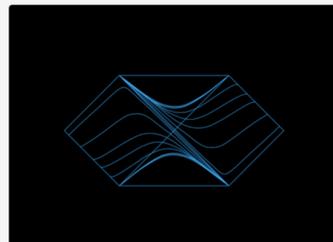


Julie de Molade

Marta Orselli



Troels Harmark



10 Jul to 13 Jul, 2023
Infinity on a Gridshell



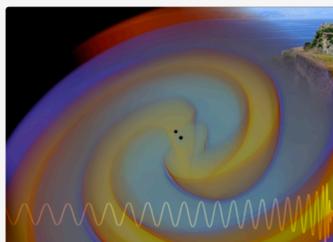
03 Jul to 07 Jul, 2023
26th Capra meeting @ NBI



26 Aug to 30 Aug, 2024
Black Holes Inside and Out



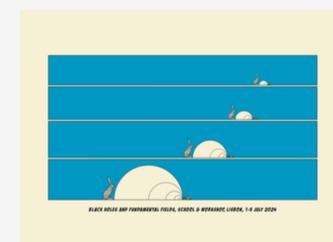
22 Aug to 24 Aug, 2024
Ringdown Inside and Out



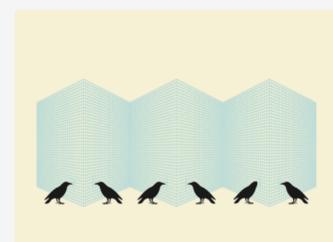
25 Sep to 30 Sep, 2023
Kavli-Villum Summer School on Gravitational Waves



09 Aug to 11 Aug, 2023
LISA in Copenhagen



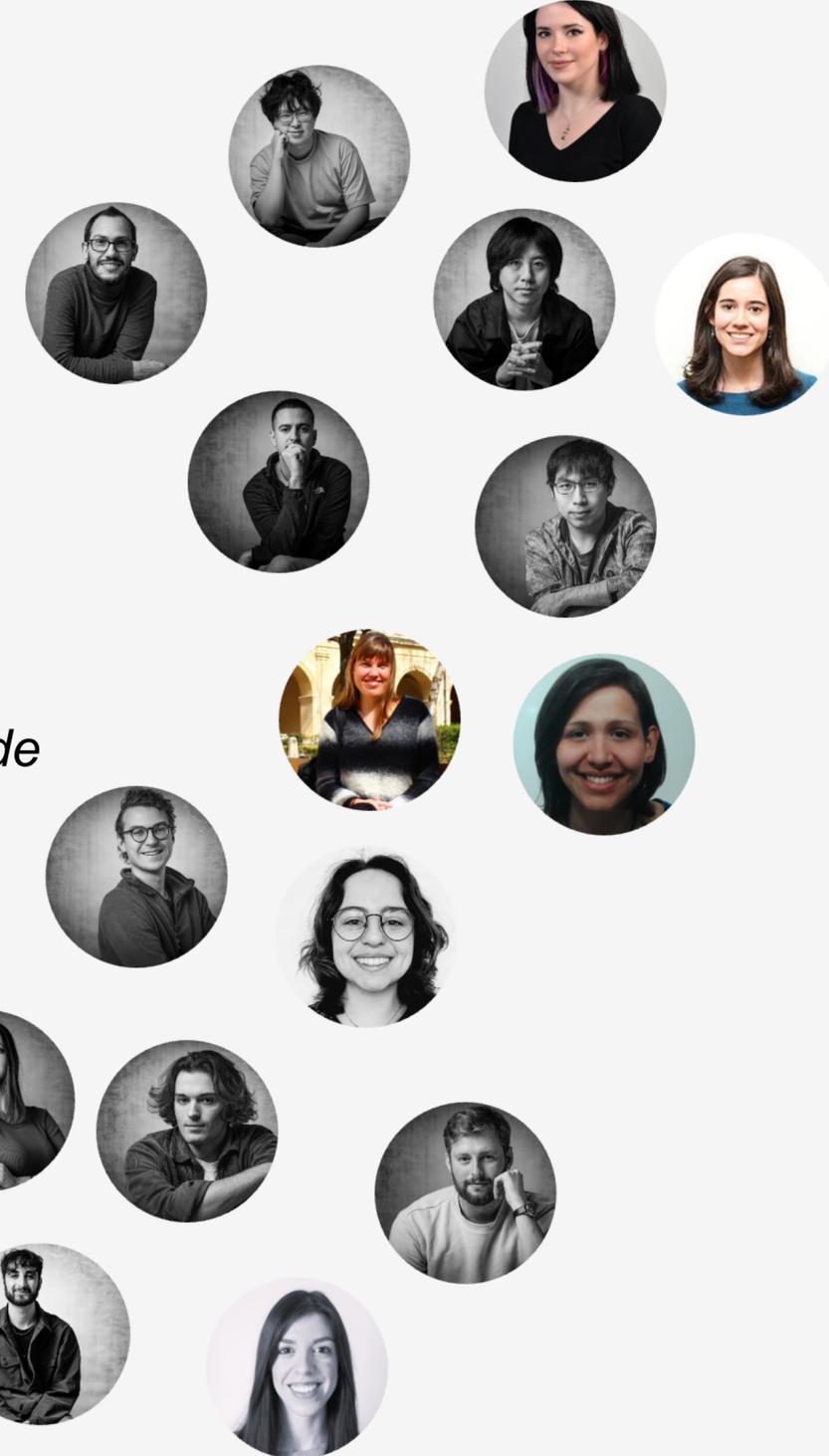
01 Jul to 05 Jul, 2024
New Horizons for Psi



18 Jun to 21 Jun, 2024
Quantum Field Theory in Curved Spacetimes Workshop III

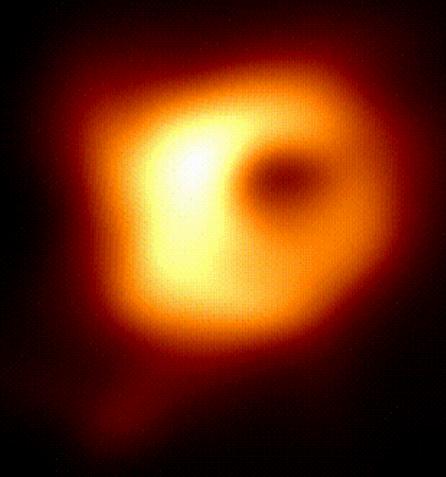
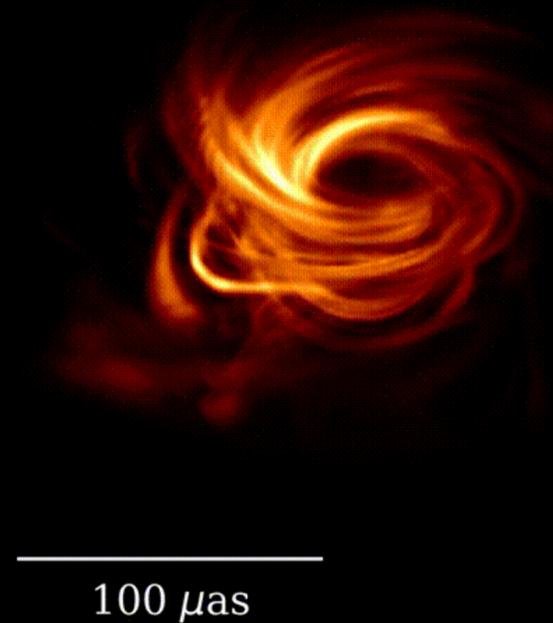
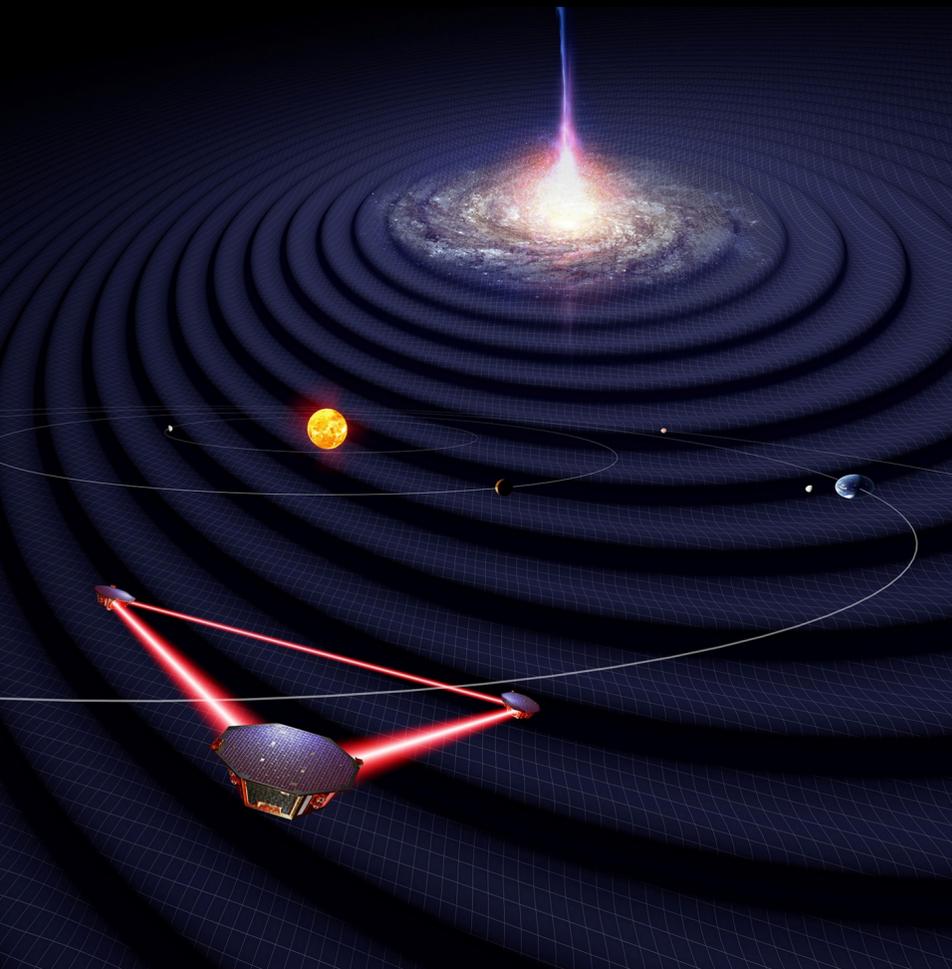
8+ conferences
in ~2 years

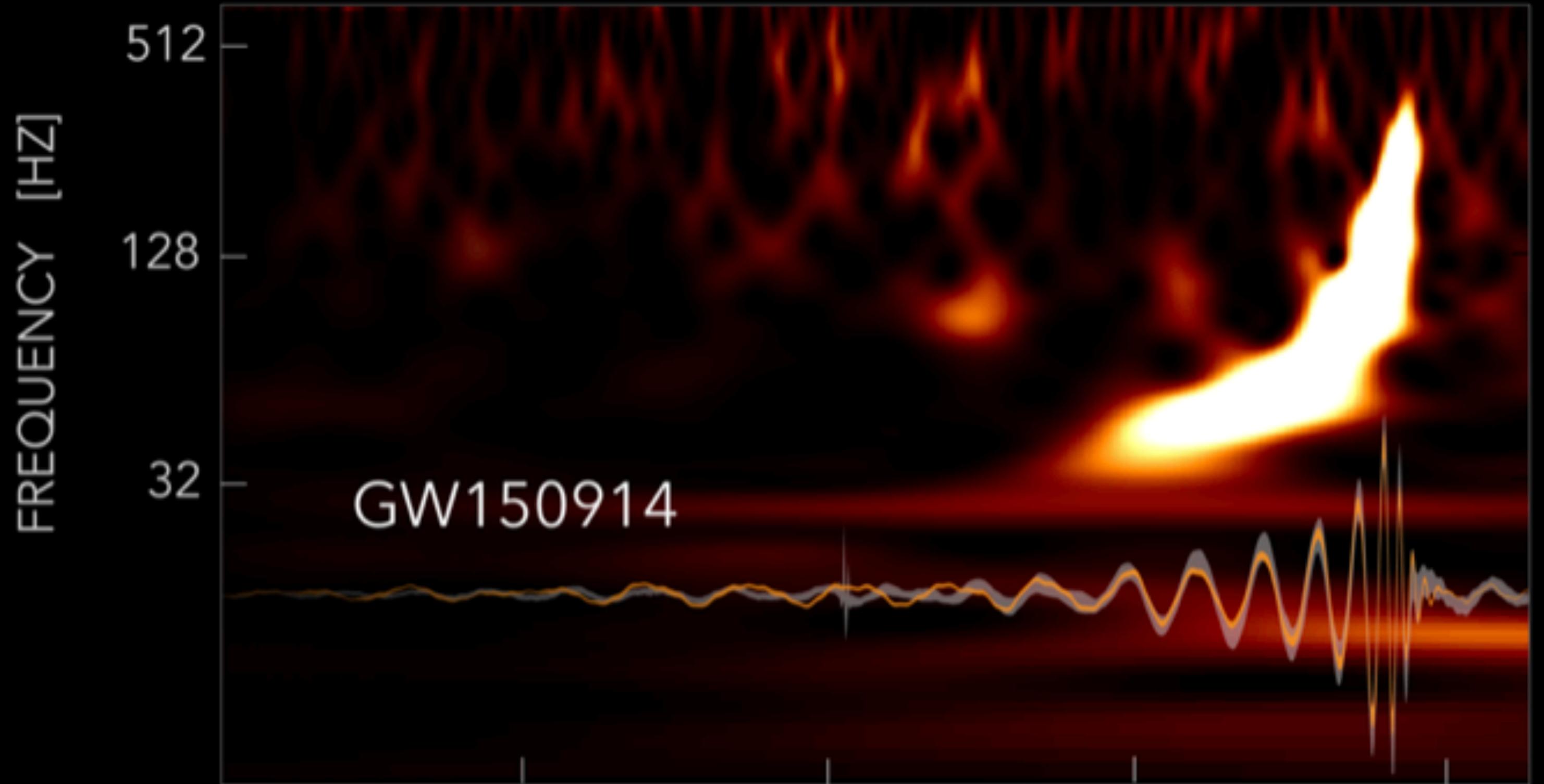
LVK, LISA, EHT, ET ...



Black holes & gravitational-wave physics

- a. Tests of strong gravity
- b. Quantify the existence of black holes in our universe
- c. Study black hole physics, and how to go beyond Einstein
- d. Use gravitational-wave observations to understand dark matter
- e. Use gravitational waves to probe the universe

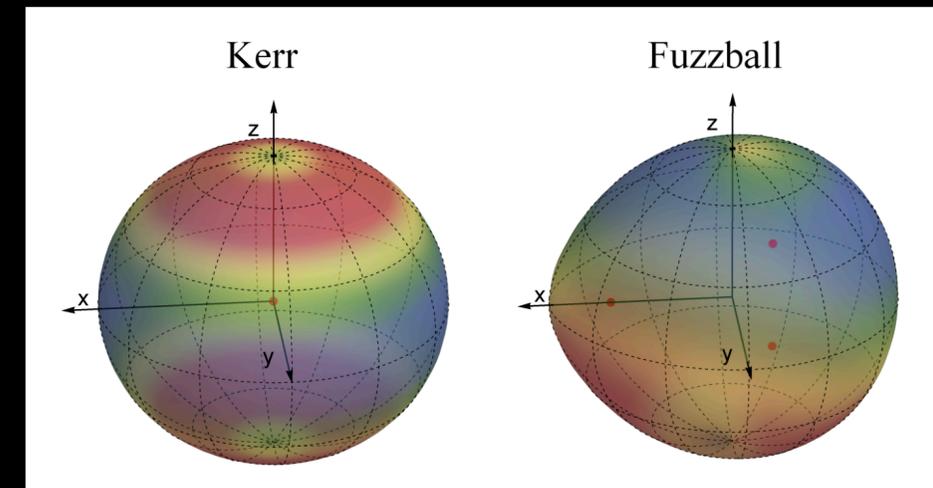
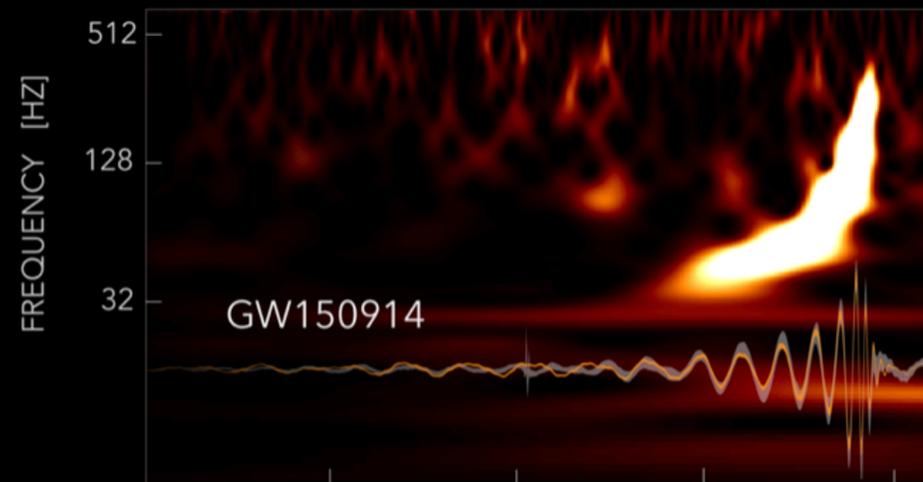
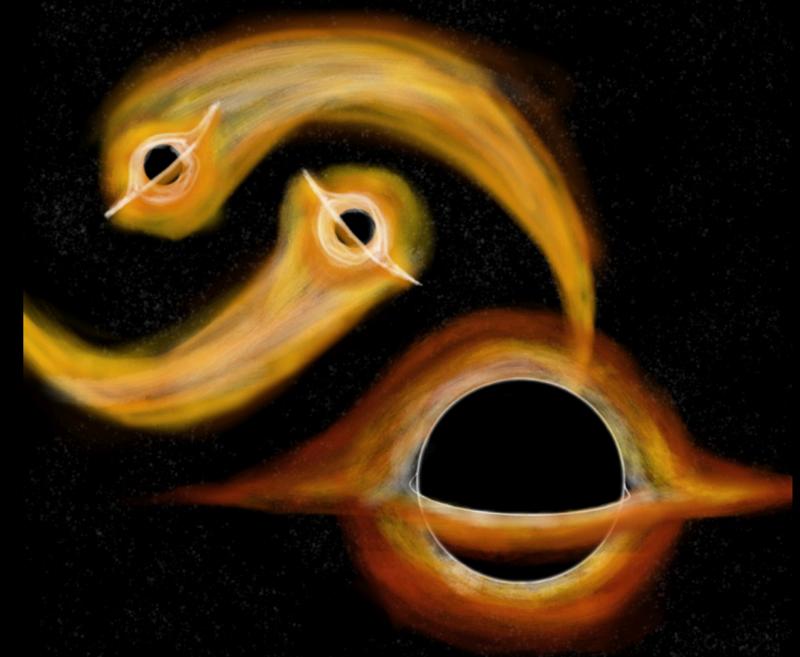
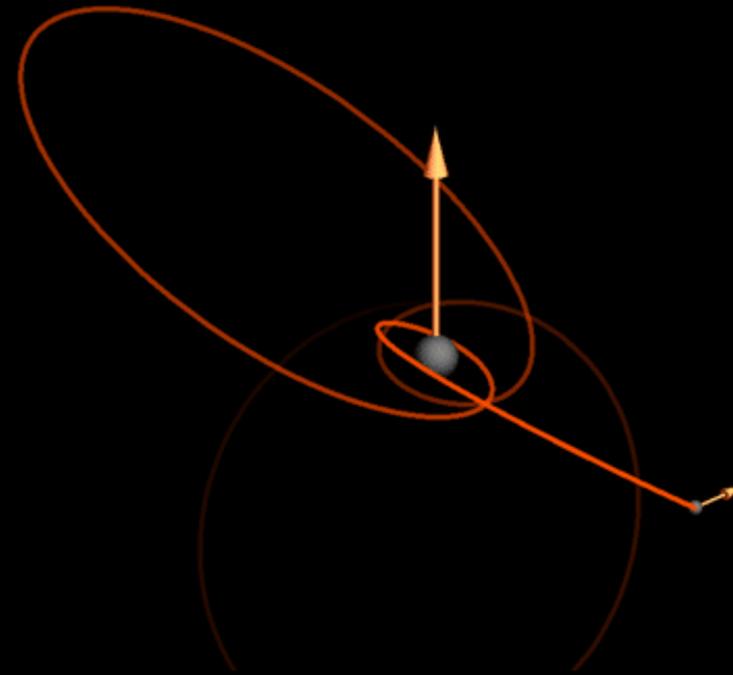




a. Tests of strong gravity & b. Existence of black holes

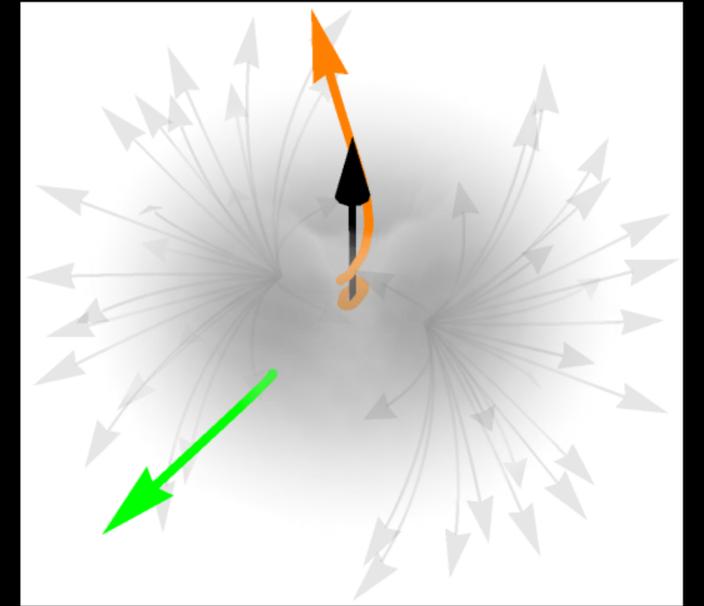
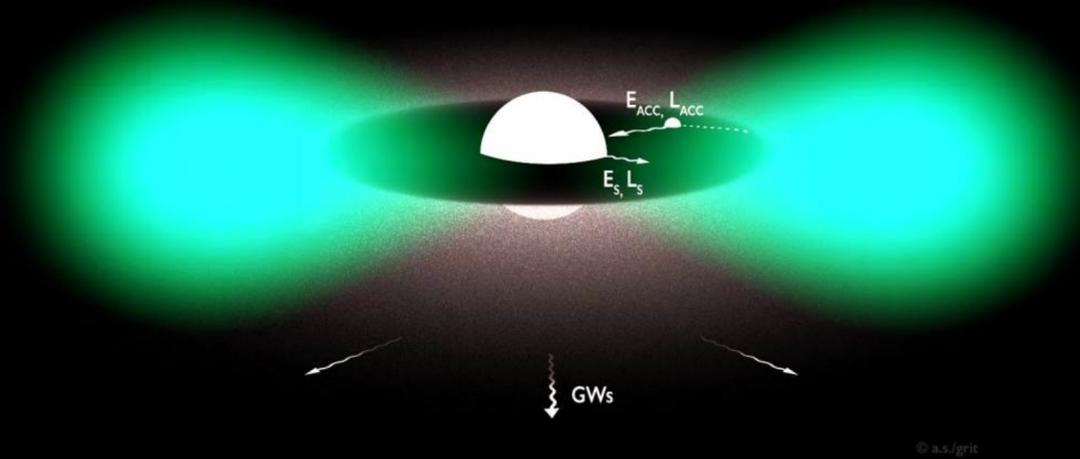
- EMRIs and LISA
- Black hole spectroscopy
- Tidal effects
- Exotic compact objects

People: Katagiri, Panosso Macedo, Harmark, Orselli, van de Meent, Cardoso, Magaña, Maggio, Pereñiguez, Minucci



c. Beyond GR & d. Dark Matter

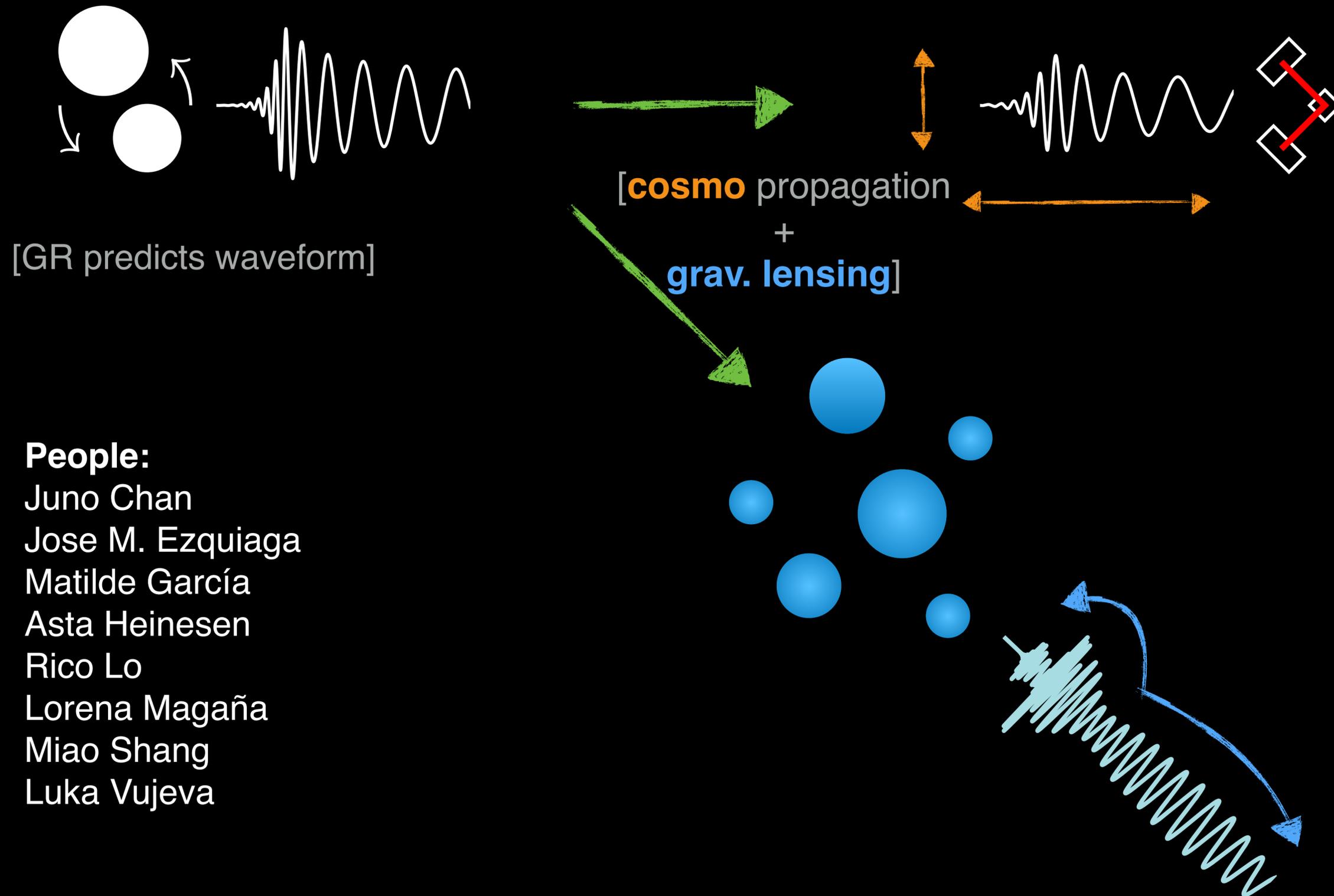
- Black hole superradiance
- Ultralight bosons & EHT
- Higher-curvature gravity



People: Chen, Panosso
Macedo, van de Meent,
Katagiri, Cardoso, Pereñiguez,
Harmark, Orselli

$$S = \int dx \sqrt{-g} (R + \ell^n \mathcal{L}_n (\text{Riemann}))$$

e. Gravitational waves to probe the universe



[GR predicts waveform]

[cosmo propagation
+
grav. lensing]

People:

Juno Chan
Jose M. Ezquiaga
Matilde García
Asta Heinesen
Rico Lo
Lorena Magaña
Miao Shang
Luka Vujeva

GOALS:

- Measure expansion rate of the Universe
- Discover GW lensing
- Probe dark matter substructure
- Test general relativity & cosmological principle
- Understand origin observed black holes

We are members of:

- LIGO Collaboration
- LISA Consortium



The Strong Team



MSc course: *Black holes & gravitational waves*

***Do you want to learn about all
of the previous topics?***

Lecturers: Jose M. Ezquiaga & Maarten van de Meent

Placement: Block 4

Timetable: Lectures: Tuesdays 10-12 & Thursdays 13-15. Exercises: Thursdays 15-17

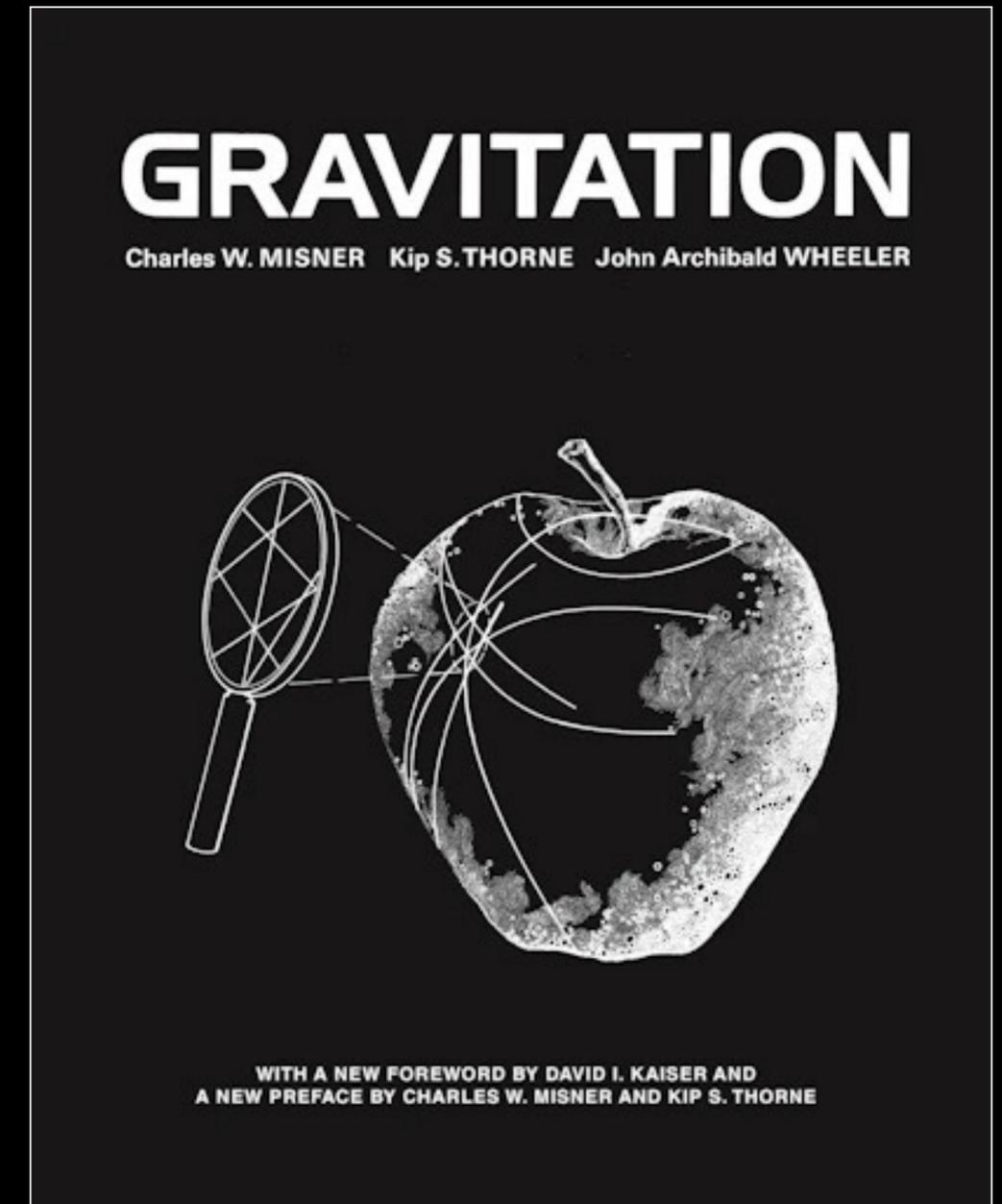
Location: Aud. C

Credits: 7.5 ECTS

Evaluation: exercises + take home exam

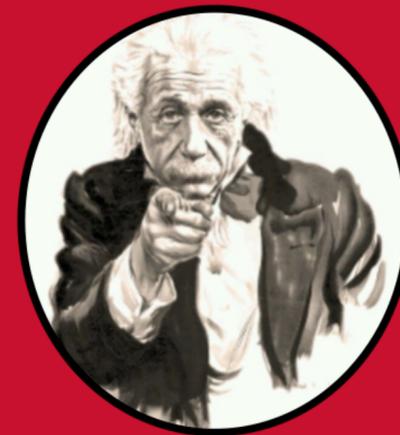
Materials: [Lecture Notes](#) and [GitHub](#)

Sing up [HERE!](#)



Research @ strong-gr

Check out our MSc projects and contact us,
we want you!



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Third floor building C
First floor building A