

General relativity : Introduction to Group III

Handout 1

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April 6, 2021

Organizational aspects

Hi everyone! Welcome to the group 3 tutorial of your "General Relativity" course. I will be leading this group and am absolutely excited to unravel the beautiful and chaotic world of Einstein's theory of relativity together with you. It is an 8 ECTS course as you all know. The lectures will be in a recorded format and you will get access them every Monday and Wednesday mornings. You will be having assignments which you will have to hand in and get a certain percentage to be eligible for the final exam. (I did the cosmology course with Prof. Amendola and Dr. Gomez-Valent. I can honestly say that the assignments were excellent and you really learned the subject on the go. But, I think I can safely say they will be quite time consuming).

I have created a ***Rocket-chat*** group for all of us. I intend to use it for all communications so I would strongly advice you to join it. The following are the main links that you will need in terms of organization

- Rocket chat server for group 3 (link)
 - (If you want to use rocket chat on your cellphone, this is the workspace url of our faculty : <https://uebungen.physik.uni-heidelberg.de/chat>)
- Prof. Amendola's webpage - Lecture notes, syllabus and some organizational stuff are already up.
- My personal web-page. (link) - (Still updating the page for the course)
 - I will upload all the lecture-slides or anything related to our tutorials here. (Sometimes password protected)
- What is missing and will be announced in due time?
 - Where to submit the assignments? How much % you need in order to be admitted to the exam? Can you do the assignment in groups?
 - Where are lectures being uploaded?
 - What is the format of the final exam?

About me

Here is a little information about me. I am a Master's student like a few of you in the course (I see a lot of B.Sc. students are signed up for the course - I did GR during my B.Sc. too, and ended up doing my thesis in it as well, it was absolutely worth it - you can find it here). Ironically, I finished my thesis in 2019 by doing a literature review about the exact work for which Roger Penrose received the 2020 Nobel (I am pretty sure Stephen Hawking would also received it if he had been alive, nearly most lot of the work which fetched the Nobel, was done by them together).

Apart from pure research interests in Early Universe Cosmology and String theory, I am very much dedicated towards development in the didactic of physics. I have over 250 hours of undergraduate

classroom teaching from subjects varying from *special relativity* to *quantum mechanics* to *measure theory* at my previous university in Leipzig. Teaching physics is something I have been doing now for over 5 years (from private tutoring to the undergraduate classroom teaching). I honestly enjoy doing this, and I really hope you will be able to see that during our tutorials. You can always reach out to me via email or rocket-chat.

How do I plan to organize the tutorials

The most common tutorials I have had since I moved to Heidelberg are the ones where the tutor generally sits back and let the students present their work. (I think this makes some sense if you do not have to hand in your homework, just to keep everyone in the loop). But, as that is not the case for us, I would like to take the baton and *present the solutions myself*. I don't think presenting solutions should be the only agenda for our 105 minutes tutorials. So, I have a proposal for you that I would like to suggest,

- **First 50 minutes of the tutorial**

- I will *present and explain solutions to the exercises* (either using beamer slides or by writing on my iPad) which will have the highest vote on Rocket-Chat. (I will post a poll on Rocket-Chat after you hand in your solutions every week)

- * For solutions that have been voted out, I will make sure you have access to the correct solutions.

- **Next 45 minutes of the tutorial**

- I will prepare material on the topics parallel to what Prof. Amendola is doing in his lectures and summarize them for you from a more intuitive perspective. We will do more examples to understand the concepts. We can do this based on your demands. Suppose a majority of you have had difficulty understanding a particular concept from the lectures, I will repeat it here and give it a slightly “student’s perspective” treatment. (This is the part of my tutorials that my past students have loved the most according to a dozen feedback forms)

- **Last 10 minutes of the tutorial**

- Well, Q&A session. We can clear quick doubts, I can answer conceptual questions, etc. (Obviously, you are always encouraged to raise your virtual hand on zoom in between for any questions. If there are no questions, you can ask me to summarize the main results in these 10 minutes)

Obviously, the time breakdown of every segment here will vary for every tutorial (assuming a majority of you agrees on this proposal). Sometimes, we will spend the whole time just on exercises (and I will to build on concepts or give extra intuition about them) while doing so. Sometimes, we will be done in 30 mins for the exercises.

I have set up a poll on the rocket-chat regarding whether you agree with this proposal or not. Do vote there and give me any feedback or suggestions you have.

One last thing. All my teaching was done pre-COVID and in a classroom full of enthusiastic students. I knew each and every one of them personally and even now keep in touch with a lot them. One of the ways to asses whether the classroom understood what I am explaining, or if I need to repeat myself was by looking at their expressions and reading the vibe of the classroom. I unfortunately cannot do this while talking to a blank screen. It would be very awesome if you could take turns, in groups of 5 to keep your cameras on just so I can read the same expressions and not teach to a blank screen. (Obviously, this is just a suggestion. You do not have any obligation to keep your cameras on. I will make a poll about it and if a majority of you agree, I will randomly choose 5 names before every session to make it happen).

I hope you all had a nice break and are looking forward to the GR course. I promise you to give my best to show you how beautiful the subject is indeed. See you all on Rocket-Chat!