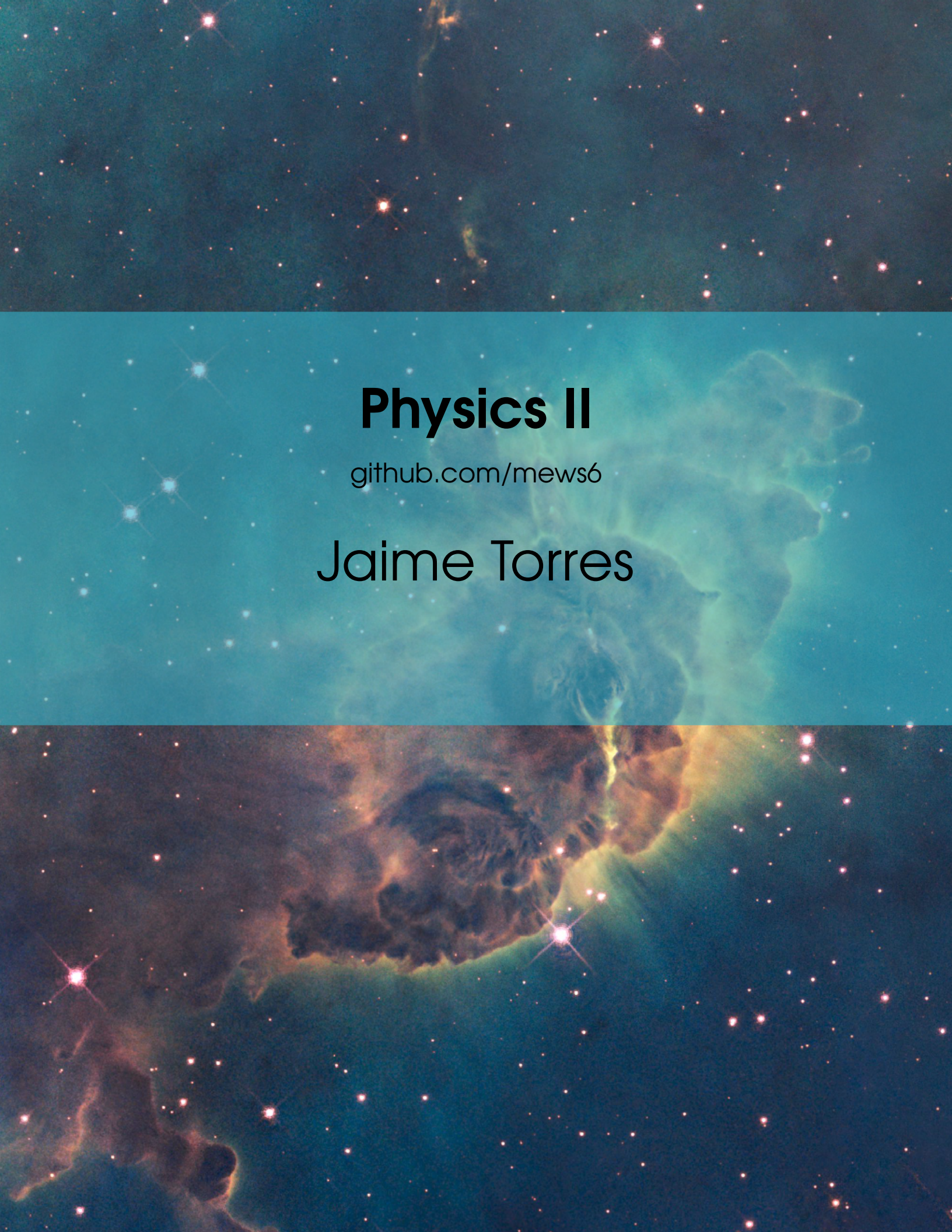

Physics II

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Contents

1. Introduction

First of all, Welcome! I hope i can explain Physics II in a somewhat friendly way, and i hope that whatever it is you need this text for, you can succeed on it. Sometimes these topics can feel a bit dense (because they are) and even though not the most rigurous of texts, i hope this little guide helps you. Now, before we start with anything, there are a few things i think we should take into account:

There's a mistake in this book! What do i do?

Tell me what it is, just let me know and maybe even correct it yourself, i have no reservations on making changes in case it happens to be necessary or otherwise useful.

As a little (final) side note, here's some cool people i took Physics II with, they speak spanish and might not respond, but if you can contact them (and know how to speak spanish), they might help you!

- Daniel Esteban Olaya (de.olaya1318@uniandes.edu.co)
- Paula Giraldo Gallo (pl.giraldo@uniandes.edu.co)

2. Fundamentals

The II in 'Physics II' is of course, a signifier of continuity, and you sometimes don't really remember the things that you saw one, or a few semesters ago. So before you start thinking on the concpts unique to Physics II, a few reminders might be on course for this text. This non-comprehensive collection of topics should be a quick reminder of a few concepts. But i urge you to read them on your own.

2.1 Newton's Laws

Newton's laws of motion are three basic laws of classical mechanics that describe the relationship between the motion of an object and the forces acting on it.

2.1.1 First Law

A body in state of rest, or in uniform motion in a straight line will have an overall summatory of forces equal to 0

$$\sum \vec{F} = 0 \tag{2.1}$$

2.1.2 Second Law

A net force that acts over a body makes it accelerate in the same direction as the net force. The magnitude of acceleration is directly proportional to the magnitude of the forces acting over it.

- if a net force acts over a body, this body accelerates
- The direction of acceleration is the same as a net force.

we can assume:

$$\vec{F}_{net} = m\vec{a} \tag{2.2}$$

$$\vec{F} = \frac{d\vec{p}}{dt} \tag{2.3}$$

2.1.3 Third Law

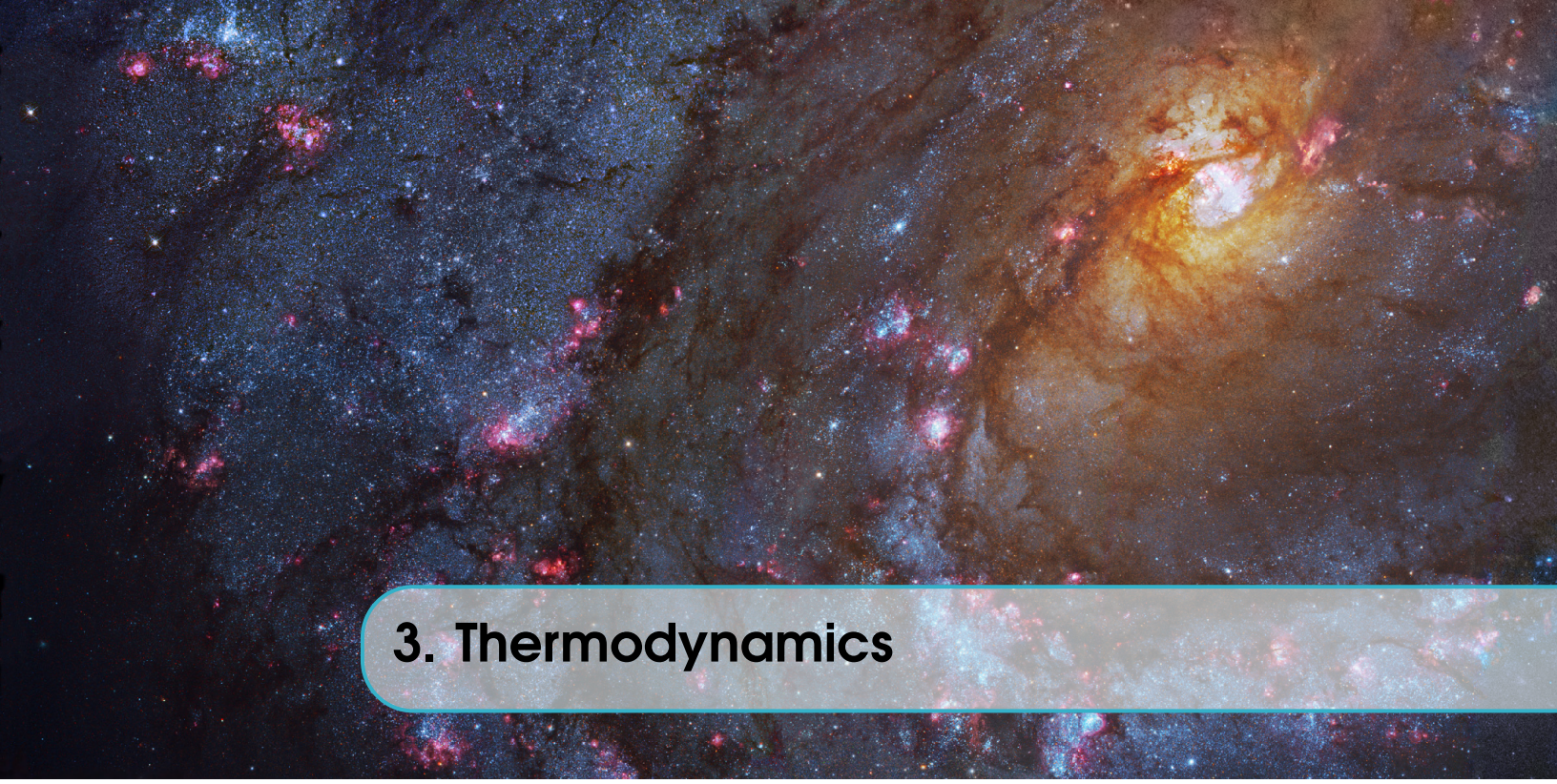
When two bodies interact their forces are always equal in magnitude and opposed in direction. This can be expressed as:

$$\vec{F}AB = -\vec{F}BA \tag{2.4}$$

Important Equations

$$\vec{F} = m\vec{a} \tag{2.5}$$

$$\vec{T} = I\vec{\alpha} \tag{2.6}$$



3. Thermodynamics

As it is defined on Sears and Zemanzky's University Physics:

"Thermodynamics are the study of energy transformations where there is an intervention between mechanical energy, heat, and other forms of energy (...)" [You+12]

In this section, we'll be talking about the different ways we can analyze, comprehend and manage such topics.

3.1 Temperature and Heat

Although easily interchangeable in common day language, when talking formally, Temperature and Heat are different physical concepts, For once, heat is a form of energy transference, measured in Joules (J). Temperature, instead, is an associated characteristic of an object. We'll treat both as diferent things during the course

3.2 Thermal Dilation

Temperature can make objects change their size, given a drastic enough Temperature change affecting the object. This is defined mathematically as:

$$\Delta L \propto \Delta T \tag{3.1}$$

$$\Delta L \propto L_0 \tag{3.2}$$

$$\Delta L = \alpha L_0 \Delta T \tag{3.3}$$

In those formulas, α represents the thermic expansion quoefficient. with their units being measured $[\alpha] = \frac{1}{C^o}, \frac{1}{K}, \vee \frac{1}{F^o}$ However, this is a quoefficient that is different

Bibliography

[You+12] Hugh D. Young et al. *Sears and Zemansky's University Physics: with Modern Physics*. Thirteenth. San Francisco: Pearson Addison-Wesley, 2012. ISBN: 9780321696861 0321696867 9780321696854 0321696859 9780321762184 0321762185 9780321741264 0321741269 9780321696229 0321696220 (cited on page 9).