

What are Referee Reports?

How do they work?

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Typical numbers of referee reports

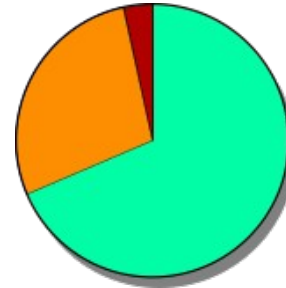
Typical (48 years old) **theoretical physicist**:

- I've received **100-200** referee reports on my papers
(i.e. published about 50 papers)

My statistics up to
summer 2022

- I've written **252** referee reports
(about 10 per year)

{ 1st report: 180
2nd report: 63
3rd report: 9



Authors are/were
allowed up to
three rounds

Time per report written: 1-2 days (i.e. bit less than 1 month each year)

Examples of Referee Reports

Let's look at Referee Reports on my 2013 manuscript whose main message was:

We know the laws of thermodynamics give Carnot bounds on efficiency (of heat-engine, refrigerator, etc).
However, quantum mechanics gives stricter bounds.

Submitted **June 2013**,
and published as:

Robert S. Whitney, *Most efficient quantum thermoelectric at finite power output*
Phys. Rev. Lett. 112, 130601 (**April 2014**)

Report of Referee A:

In this paper, the author studies the maximum efficiency for a given power output by analyzing models described by the Landauer-Buttiker theory.

[2 more sentences]

The analysis presented in this paper is sound, ... The paper is also well-written. However, I hesitate to recommend the paper to be published in PRL. The reason is the following:

Let us recall that the Carnot efficiency is important because it is universal. [1 more sentence]

Such universality lacks in the result of the paper.

[3 more sentences]

From these points, I do not think that this paper is successfully answer the question what is the equivalent of Carnot efficiencies for irreversible systems with finite power output,

Referee's summary
of manuscript



Report of Referee A:

In this paper, the author studies the maximum efficiency for a given power output by analyzing models described by the Landauer-Buttiker theory.
[2 more sentences]

Referee's RECOMMENDATION
(positive/negative/...)
with one/two sentence
justification



The analysis presented in this paper is sound, ... The paper is also well-written. However, I hesitate to recommend the paper to be published in PRL. The reason is the following:

Detailed Explanation
of recommendation



Let us recall that the Carnot efficiency is important because it is universal. [1 more sentence]
Such universality lacks in the result of the paper.
[3 more sentences]
From these points, I do not think that this paper is successfully answer the question what is the equivalent of Carnot efficiencies for irreversible systems with finite power output,

Optional :

- (a) Other comments
- (b) List of typos

Report of Referee B:

The author addresses theoretically the question of the maximum thermoelectric efficiency possible at given power output.

While I am not in a position to check all derivations, it is clear that the work is done at a high level. The results are of interest and can stimulate further discussions. The issue of the maximum efficiency of thermoelectric devices has practical implications. I recommend publication.

Referee's summary
of manuscript

Referee's RECOMMENDATION
(positive/negative/...)
with one/two sentence
justification

Detailed Explanation
of recommendation

Optional :
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Report of Referee B:

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WOULD
LONGER REPORT
WOULD BE
BETTER
FOR AUTHORS?

Report of Referee C:

Referee's summary
of manuscript

Referee's RECOMMENDATION
(positive/negative/...)

with one/two sentence
justification

Detailed Explanation
of recommendation

Optional :
(a) Other comments
(b) List of typos

The manuscript by Whitney proposed conditions that a quantum system driven far from equilibrium (by finite temperature or bias voltage) should to satisfy in order to generate maximum efficiency at finite power output. For conventional bulk thermoelectric materials which operate in the linear response regime, the optimization of the figure of merit ZT can be achieved by generating sharp features in the density of states (or transmission function for meso and nanoscale systems), as discussed in a landmark paper Ref. 10 on "The best thermoelectric". The present paper (with paraphrased title of Ref. 10) could have similar impact on the very recently emerged field of nonlinear thermoelectricity.

However, in the present form the manuscript is **very difficult to read**, so the author should make effort to **make it more suitable for PRL audiences**:

1. Besides recent wave of papers on nonlinear thermoelectricity, the author should have cited earlier isolated studies such as PHYSICALREVIEW B 82, 045412 (2010) or Molecular Physics Vol. 106, Nos. 2-4, 2008, 397-404.
2. Both of papers I mentioned in 1. clearly discuss regimes in which power output is maximized, which is a prime motivation to explore this new topic. This type of discussion is missing in the present manuscript (it does appear in some other papers, e.g. arXiv:1208.6130v3).
3. The manuscript contains plenty of typos. I have made a list of them and put some of them into the display.
4. The abstract advertises how the figure of merit ZT is calculated. However, one finds that the calculation on this should be added into the main text.
5. Any nonlinearity will eventually be discussed in the next issue of Molecular Physics Vol. 106, Nos. 2-4, 2008, 397-404. The scattering formalism used in the present manuscript. The scattering formalism is not unlike some other recent closely related studies [e.g. Phys. Rev. B 87, 115404 (2013)], not even dephasing effects.
6. Since the aim of the present manuscript is to discuss what kind of transmission function optimizes ZT of linear response, it would be easier to understand the novelty of the top-hat function proposed by the author if the author had cited some of the related studies.

Six detailed criticisms of
• presentation,
• formulas,
• citations, etc.
Each in 1-2 **brutal** sentences
This referee really tried to understand everything

Types of criticisms I have received ... or given to others

Physics:

- Not understood the problem
- Made a methodological mistake
- Contradiction of known laws
(law of thermodynamics)

- Not understood the literature
- Results already well-known

Presentation:

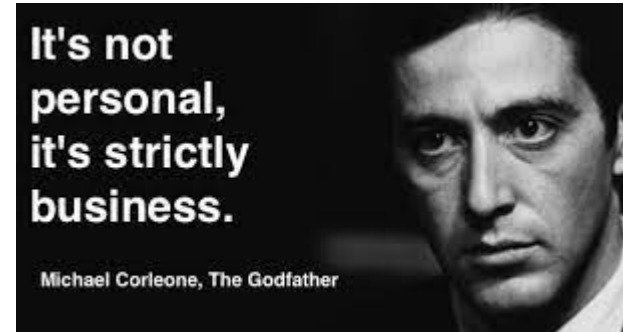
- Not cited the correct literature
- Difficult to understand
- confusing/non-standard notation
- poor English

Scope:

- Not of sufficient interest for journal
- Not experimentally realizable
- Others have done it better

MY ADVICE:

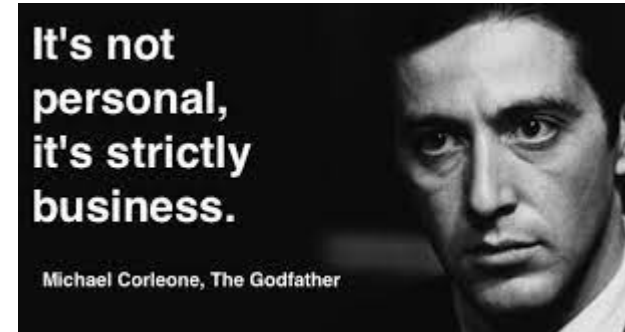
- 1) Referee reports are brutally focused on the negative
- 3) It's not personal
- 4) It often takes **calm thought** to understand a referee's point



... remember that there is no rush to reply

MY ADVICE:

- 1) Referee reports are brutally focused on the negative
- 3) It's not personal
- 4) It often takes **calm thought** to understand a referee's point



90% of referee's job:
giving free advice to make your paper better

... remember that there is no rush to reply

WHAT IS THE REFEREE'S JOB?

HOW TO RESPOND TO REFEREES?

ETHICS OF REFEREEING

IMPROVING THE SYSTEM?

REWARDING REFEREES?

WHAT IS THE REFEREE'S JOB?

- Finding mistakes, evaluating impact, rejecting bad works, making papers better?
- Time per report? Speed of response? Number of reports? Priority versus other work?

ETHICS OF REFEREEING

- When are you qualified to referee a manuscript?
- Avoid refereeing friends and colleagues?
Which colleagues?
- Unconscious bias and subjectivity:
 - in favour of famous scientists?
 - against women, minorities, or developing countries?
 - in favour of your pet theory ?
- Refereeing for journals that you don't like (too expensive, poor quality, etc)?

HOW TO RESPOND TO REFEREES?

- Tone & length of response? What to say?
- **What not to say?**
- Response letter vs modified manuscript?

IMPROVING THE SYSTEM?

- Referee anonymity or not? Double-blind refereeing?
- Reports (and author replies) published with article?
- Abolish referee reports completely? Replace with?

REWARDING REFEREES?

- Payment for refereeing? Money/vouchers?
- Points & prizes for refereeing (publons, etc)?
- Included in researcher evaluation?