



## Review report of a final thesis

**Student:** Petr Dostál  
**Reviewer:** prof. Dr. Ing. Petr Kroha, CSc.  
**Thesis title:** Optimization of the Matching Criteria Between the ATLAS and AFP Detectors at CERN  
**Branch of the study:** Web and Software Engineering

**Date:** 12. 6. 2020

<i>Evaluation criterion:</i>	<i>The evaluation scale: 1 to 4.</i>
<b>1. Fulfilment of the assignment</b>	<i>1 = assignment fulfilled, 2 = assignment fulfilled with minor objections, 3 = <b>assignment fulfilled with major objections</b>, 4 = assignment not fulfilled</i>
<i>Criteria description:</i> Assess whether the submitted FT defines the objectives sufficiently and in line with the assignment; whether the objectives are formulated correctly and fulfilled sufficiently. In the comment, specify the points of the assignment that have not been met, assess the severity, impact, and, if appropriate, also the cause of the deficiencies. If the assignment differs substantially from the standards for the FT or if the student has developed the FT beyond the assignment, describe the way it got reflected on the quality of the assignment's fulfilment and the way it affected your final evaluation.	
<i>Comments:</i> The assignment was fulfilled with major objections. The reason is that the author did not explain and did not define the objectives sufficiently. In fact, he did not define the objectives at all. It has not been revealed what kind of optimization he is solving, and he did not compare the "simple" version with the "optimized" version. There is a notice about "speed optimization" on page 18 (Chapter 3.5), but the text is chaotic and not clear enough. Very probably the author knew what he was programming, but he did not write it.  I cannot decide about the quality of results, because particle physics is not my branch. In any case, from the viewpoint of physics, the thesis results are part of the CERN research report cited as [17], i.e., it was successful.  However, I am completely sure that this assignment is not suitable for a student in software engineering.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
<b>2. Main written part</b>	<i>50 (E)</i>
<i>Criteria description:</i> Evaluate whether the extent of the FT is adequate to its content and scope: are all the parts of the FT contentful and necessary? Next, consider whether the submitted FT is actually correct – are there factual errors or inaccuracies? Evaluate the logical structure of the FT, the thematic flow between chapters and whether the text is comprehensible to the reader. Assess whether the formal notations in the FT are used correctly. Assess the typographic and language aspects of the FT, follow the Dean's Directive No. 26/2017, Art. 3. Evaluate whether the relevant sources are properly used, quoted and cited. Verify that all quotes are properly distinguished from the results achieved in the FT, thus, that the citation ethics has not been violated and that the citations are complete and in accordance with citation practices and standards. Finally, evaluate whether the software and other copyrighted works have been used in accordance with their license terms.	

*Comments:*

The main written part is written in English. There are some mistakes, like "In this chapter are discussed all the results..." (page 21), but the text is grammatically understandable. Often, the content is not understandable because it is too brief.  
Problems:

1. The volume of the work is 51 pages, but only 27 pages are full-text page.
2. The text structure is not appropriate. The first half of the text (12) pages describes the physical process, during which data are created that have to be analyzed. It is very interesting, but the description of "axion-like particles" investigation in CERN is not detailed enough to be understandable.
3. Figure 1.1 can be omitted without any information lost.
4. Figure 1.4 is not explained in detail. In the cited research report [17], it is discussed in more details, but the report has 33 pages describing only the physical process.
5. The software part of the thesis starts on page 14 in Chapter 3.2. In Chapter 3.1, there is a half-page long notice concerning the database ROOT, where the results of measuring are stored in CERN. Unfortunately, the author did not describe the data structures of data that he has to use as input data in his scripts.
6. On pages 15-19, the implementations of four C++ scripts are very briefly mentioned but not explained.
7. There is not a trace concerning assignment analysis, design, and testing. The problem is that these concepts are the core focus of software engineering that the thesis should follow.
8. Chapter Results contains mostly tables and graphs. Maybe, they are understandable to specialists in particle physics, but for other people are not explained enough.
9. In the last Chapter Conclusions, the author claims that "This thesis provides an important step in the analysis of light-by-light scattering mediated by an Axion-Like-Particle(ALP). How much it is true or false I cannot decide.

*Evaluation criterion:*

*The evaluation scale: 0 to 100 points (grade A to F).*

**3. Non-written part, attachments**

70 (C)

*Criteria description:*

Depending on the nature of the FT, comment on the non-written part of the thesis. For example: SW work – the overall quality of the program. Is the technology used (from the development to deployment) suitable and adequate? HW – functional sample. Evaluate the technology and tools used. Research and experimental work – repeatability of the experiment.

*Comments:*

The quality of the non-written part is average.

The quality of the C++ scripts cannot be decided without testing, but this was the task (not fulfilled) of the author.

*Evaluation criterion:*

*The evaluation scale: 0 to 100 points (grade A to F).*

**4. Evaluation of results, publication outputs and awards**

70 (C)

*Criteria description:*

Depending on the nature of the thesis, estimate whether the thesis results could be deployed in practice; alternatively, evaluate whether the results of the FT extend the already published/known results or whether they bring in completely new findings.

*Comments:*

The author considers the following as his main achievement (page 27):

"The analyzed similarity between PSI-AFP a PSI-GAMMA, GAMMA is a random coincidence instead of a physics process with low randomness."

Let us the supervisor to decide it.

*Evaluation criterion:*

*No evaluation scale.*

**5. Questions for the defence**

*Criteria description:*

Formulate questions that the student should answer during the Presentation and defence of the FT in front of the SFE Committee (use a bullet list).

*Questions:*

1. How the optimization in your approach is defined?
2. What is the comparison between the "simple" procedures and the "optimized" procedures?
3. Explain Fig. 1.4!
4. Testing?

*Evaluation criterion:*

*The evaluation scale: 0 to 100 points (grade A to F).*

**6. The overall evaluation**

50 (E)

*Criteria description:*

Summarize which of the aspects of the FT affected your grading process the most. The overall grade does not need to be an arithmetic mean (or other value) calculated from the evaluation in the previous criteria. Generally, a well-fulfilled assignment is assessed by grade A.

*Comments:*

Summarised, the structure of chapters and the text are of poor quality. What had to be explained was only chaotic and superficially described.

Using 27 pages only, it is not possible to describe the physical part and the software part of the thesis sufficiently and understandable.

There is a question of where in the thesis is a part concerning software engineering approach. I did not find it.

The thesis does not contain the structure of input data, state-of-the-art, assignment analysis, design, and testing.

The thesis does not contain the comparison between the optimized and not optimized procedures.

There is a good possibility that the thesis contains some revolutionary results in particle physics concerning the investigation of Axion-Like-Particle.

Still, it is the role of the supervisor to decide it.

Signature of the reviewer: