

The submitted paper is a first revision of the manuscript “Towards a PIRL framework for Efficient Airfoil Design” (Paper ID 58) that has been submitted to AIRoV and for which a major revision had been requested in March 2026.

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Organizer Team

We would like to thank you for considering our manuscript. We have carefully considered the reviewers’ suggestions and have prepared a revised version of the paper accordingly. The main changes are as follows:

Title Both reviewers pointed out that the ”Airfoil” word at the title was never explained in the text and suggested a correction on the title. We agree that the term “airfoil” was not properly introduced or explained in the manuscript. Accordingly, we have replaced “airfoil” with ”diffuser” or “channel” throughout the title, abstract and the main text to ensure consistency and clarity. While airfoil shape optimization is conceptually related to the broader scope of this work, we agree that it is not sufficiently developed in the current extended abstract to justify its inclusion.

Paper lenght In response to the reviewers’ suggestions, we have added several lines and a new paragraph to improve clarity and completeness, while preserving the original text as much as possible. As a result, the revised manuscript exceeds the 4-page limit. We have therefore sent an email to seek guidance on how to proceed in this regard.

In what follows, we provide a detailed response to each comment and outline the corresponding modifications made to the manuscript.

Reviewer 1

We would like to thank you for your careful review of the manuscript. We have incorporated your suggestions accordingly.

1.1. While the overall concept seems appealing and is mathematically rigorously formulated, it would be highly desirable for the practicing engineers in the audience to elaborate a bit more on the airflow optimization application.

We thank the reviewer for this valuable suggestion. Following this comment (and as noted below), we have replaced the term “airfoil” with “diffuser” throughout the manuscript. In addition, we have included a

new paragraph in Section 3.2 to further elaborate on the use of physics-informed features in CFD applications. Due to the length constraints of this extended abstract, we do not provide a detailed discussion of other aspects of channel shape optimization that may be of interest to practitioners, such as shape parameterization and CFD configuration. Nevertheless, we believe that the added paragraph improves the practical relevance of the manuscript and provides better guidance for engineering applications.

1.2. Fig. 2 should be improved, as the channel geometry is difficult to discern.

Figure 2 (a) has been improved to enhance the visibility of the channel geometry. In particular, we have added contour lines and adjusted the visual representation to make the geometry more clearly discernible.

1.3. Also the title "... for efficient airfoil design" is puzzling, as the application is the optimization of a heat exchanger channel.

We thank the reviewer for pointing this out. We agree that the use of the term "airfoil" in the title was misleading, given that the application presented in this work concerns the optimization of a diffuser channel. Accordingly, we have replaced "airfoil" with "diffuser" in the title and throughout the manuscript. While airfoil shape optimization is related to the broader scope of our project, it is not directly relevant to the present extended abstract and has therefore been omitted.

Reviewer 2

We would like to thank you for your careful review of the manuscript. We have incorporated your suggestions accordingly.

2.1. The title however mentions an airfoil, which is never mentioned in the text. This is misleading and surprising - needs correction of the title

We thank the reviewer for pointing this out. We agree that the use of the term "airfoil" in the title was misleading, given that the application presented in this work concerns the optimization of a diffuser channel. Accordingly, we have replaced "airfoil" with "diffuser" in the title and throughout the manuscript. While airfoil shape optimization is related to the broader scope of our project, it is not directly relevant to the present extended abstract and has therefore been omitted.

2.2. The most relevant omission: What are potential physics-informed features for the air channel? I recommend major revision and adding this information including related work on physics informed features in CFD applications.

We thank the reviewer for this important comment and fully agree with the need to better elaborate on physics-informed features in the context of diffuser channel airflow. In response, we have added a new paragraph in section 3.2 that discusses relevant physics-informed features for CFD applications and clarifies their role in the proposed approach. Due to the length constraints of this extended abstract, we provide a concise discussion and limit the inclusion of related work.

2.3. Line24-26: The project organisation is not relevant here and could be omitted.

The mentioned lines have been removed from the manuscript . We have replaced them with a shorter sentence to maintain the context.

2.4. A very important motivation is mentioned only in line 146: "CFD evaluation requires several hours" This should be mentioned more prominent in the beginning of the paper.

We agree that the computational cost of CFD evaluations is a key motivation for the proposed approach and should be emphasized more clearly. Accordingly, we have added a sentence in the introduction to make this aspect more prominent at the beginning of the manuscript.

2.5. Why is $f_{\text{feat}}(x) = f_{\text{obj}}(x) + x$ a sensible physics-informed feature?

The chosen feature is intended as a simple illustrative proxy for auxiliary information that is strongly correlated with the objective. In practical CFD applications, such features typically arise from physically related quantities and do not follow an explicit functional relationship with the objective. We have clarified this point, right after the definition of $f_{\text{feat}}(x)$ at section 3.1, in the revised manuscript.