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# Unifying the refocusing algorithms and parameterizations for traditional and focused plenoptic cameras

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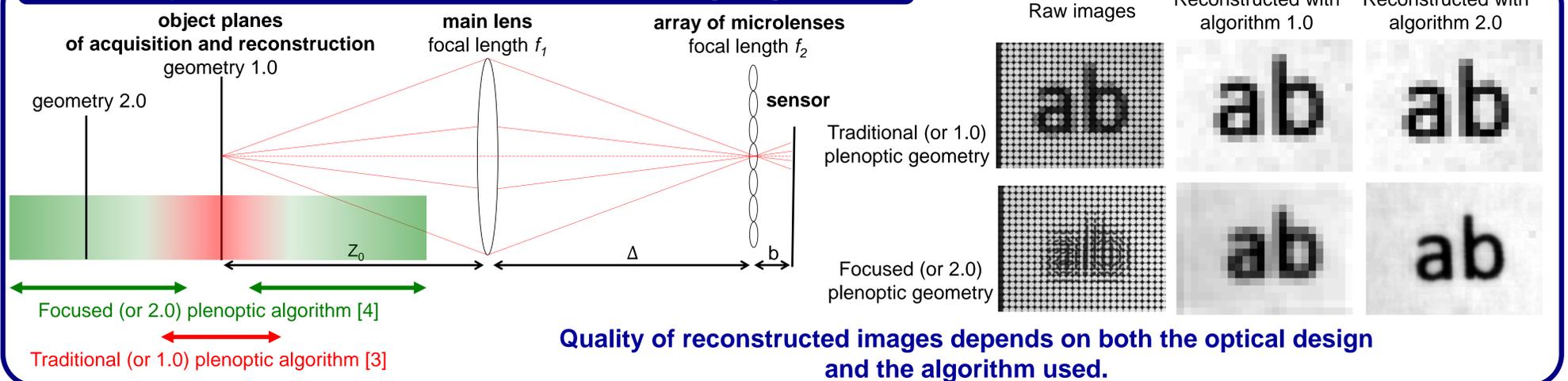
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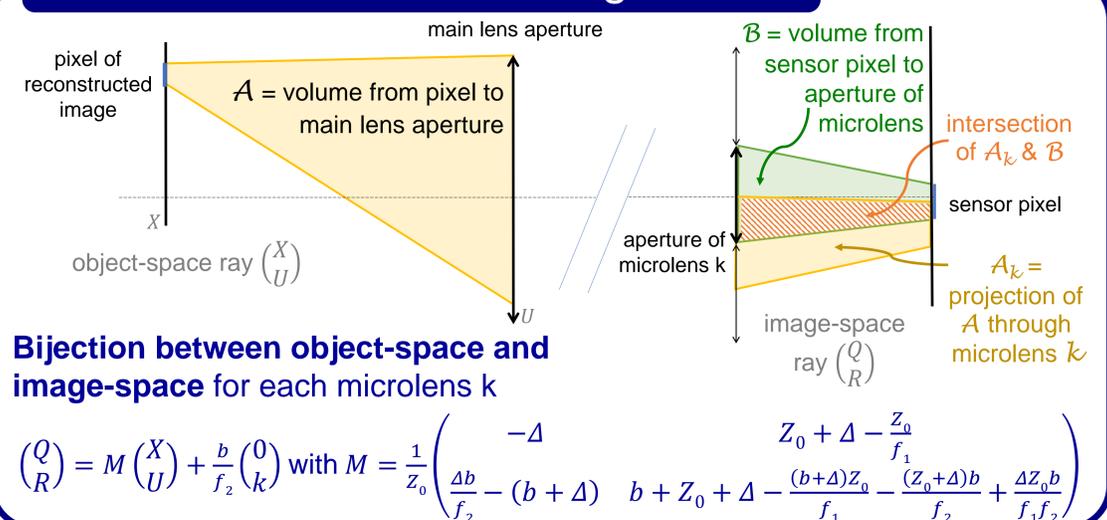
## Introduction

A plenoptic camera allows to acquire and separate spatial and directional information of the light coming from a scene [1, 2]. It allows applications such as refocusing at different depths from the one where the image has been acquired. In the literature, different refocusing algorithms are presented for several optical plenoptic configurations [3 - 6]. We have previously shown the continuity between these optical designs, and the similarities and differences between the associated algorithms [7]. Here we propose a unique parameterization of the light rays in a plenoptic setup, allowing the development of a unique refocusing algorithm valid for any plenoptic configurations, based on the integration of étendues' intersections in the image-space. With this method, we aim at refocusing images at any distances from the camera, without the discontinuity due to the change of optical configurations.

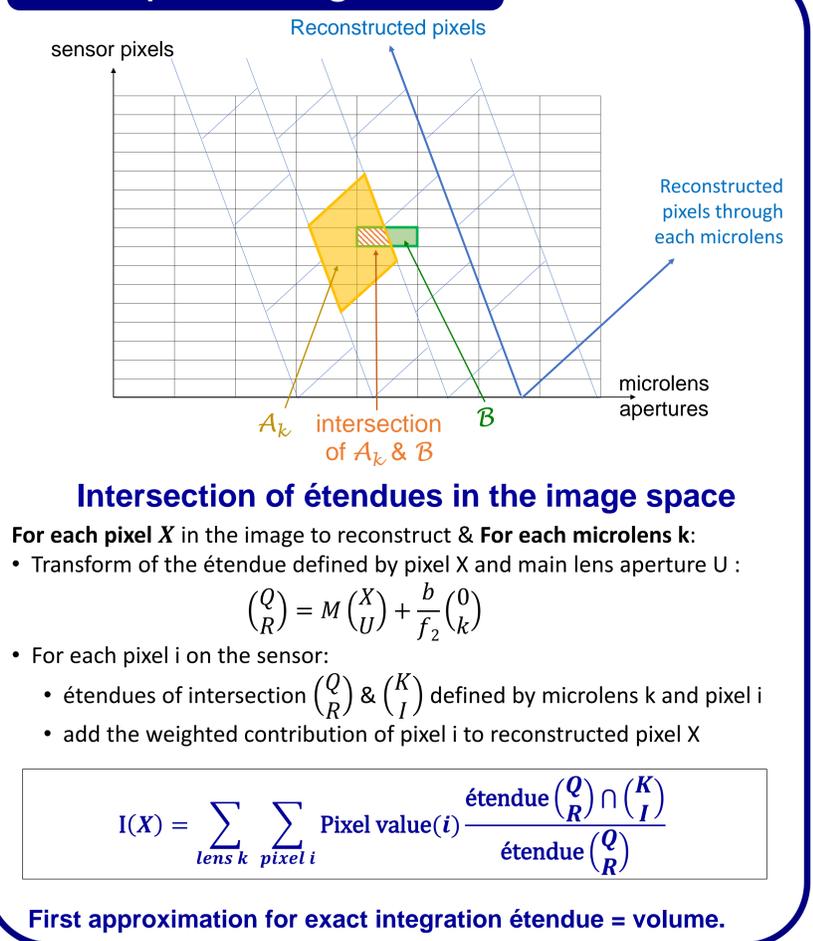
## 1. Validity domains of historical refocusing algorithms



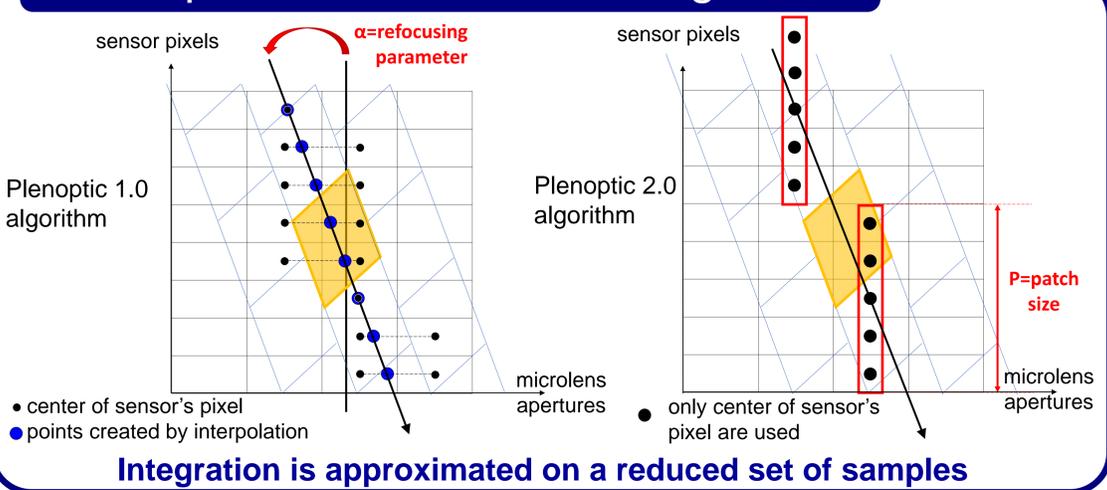
## 2. Parametrization of the Light-Field



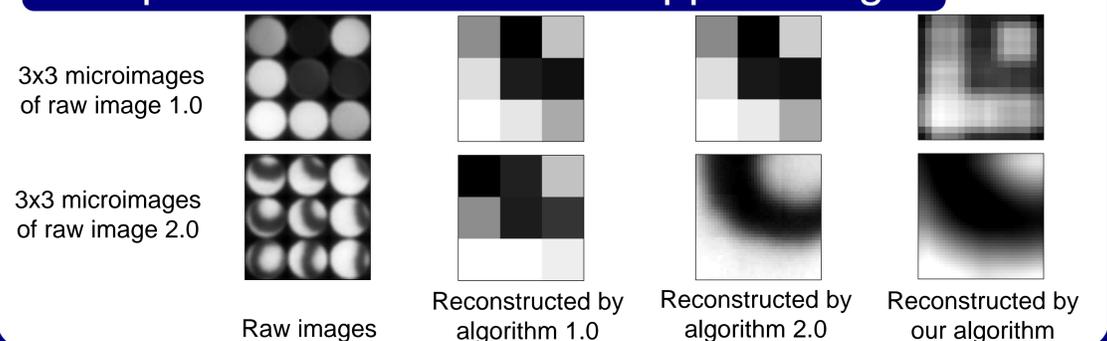
## 3. Proposed algorithm



## 4. Comparison with historical algorithms



## 5. Experimental results on cropped images



## Conclusions

- Unification of the two historical algorithms.
- Algorithm based on the intersection of étendues instead of using pixels as points.
- First implementation of algorithm → validation of the idea.
- Future work: improving execution time.

## References

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