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Inverse Identification of Mechanical Materials' Properties Using the Integrated-DIC Technique

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1 – Introduction:

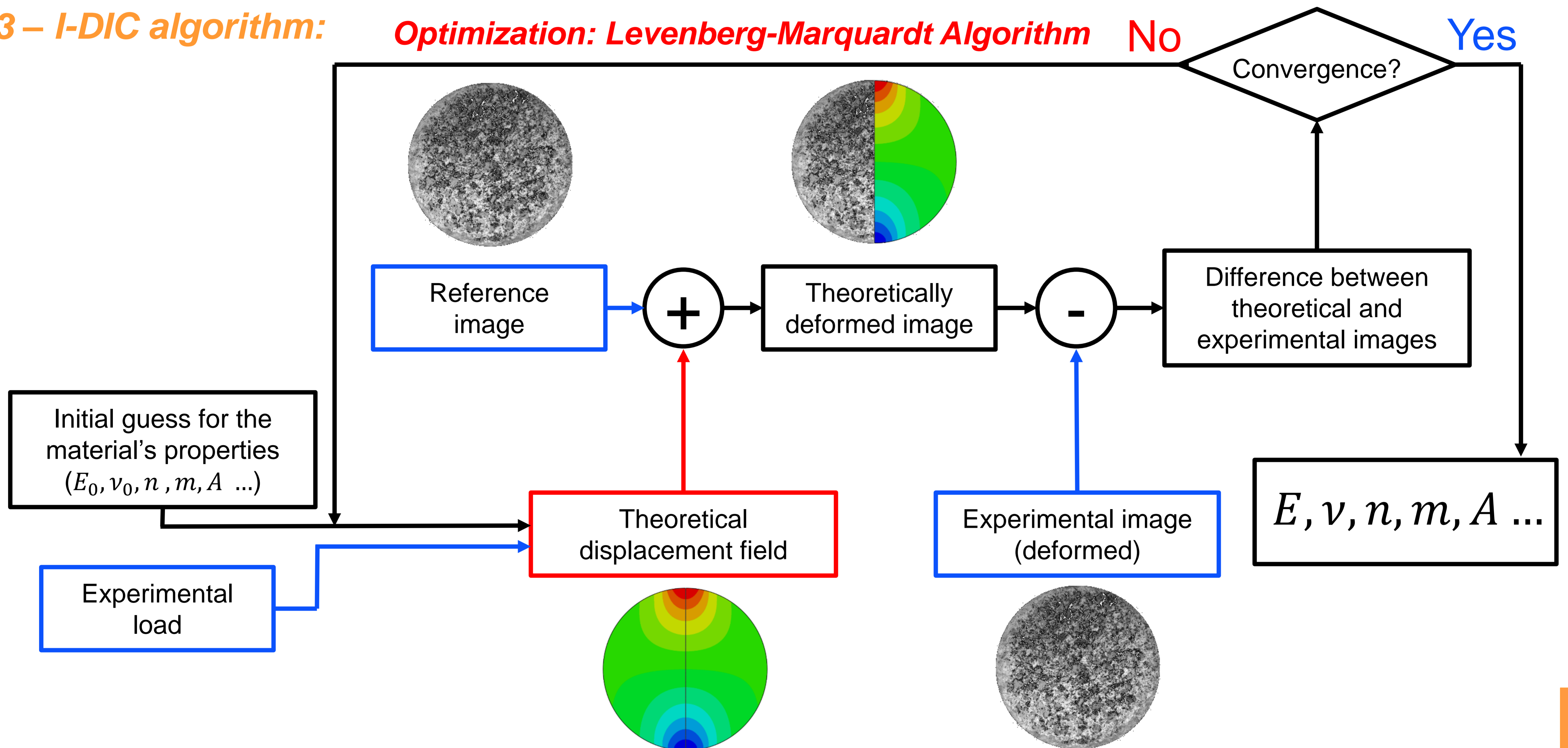
- The modelling of **refractory materials** at high temperatures requires the determination of the most suitable **mathematical models**
- Moreover, accurate models tend to require **complicated testing** for the determination of the **materials' parameters**
- Digital Image Correlation** techniques have been used to close the gap between complex materials' models and the determination of the required mechanical properties

2 – Objectives:

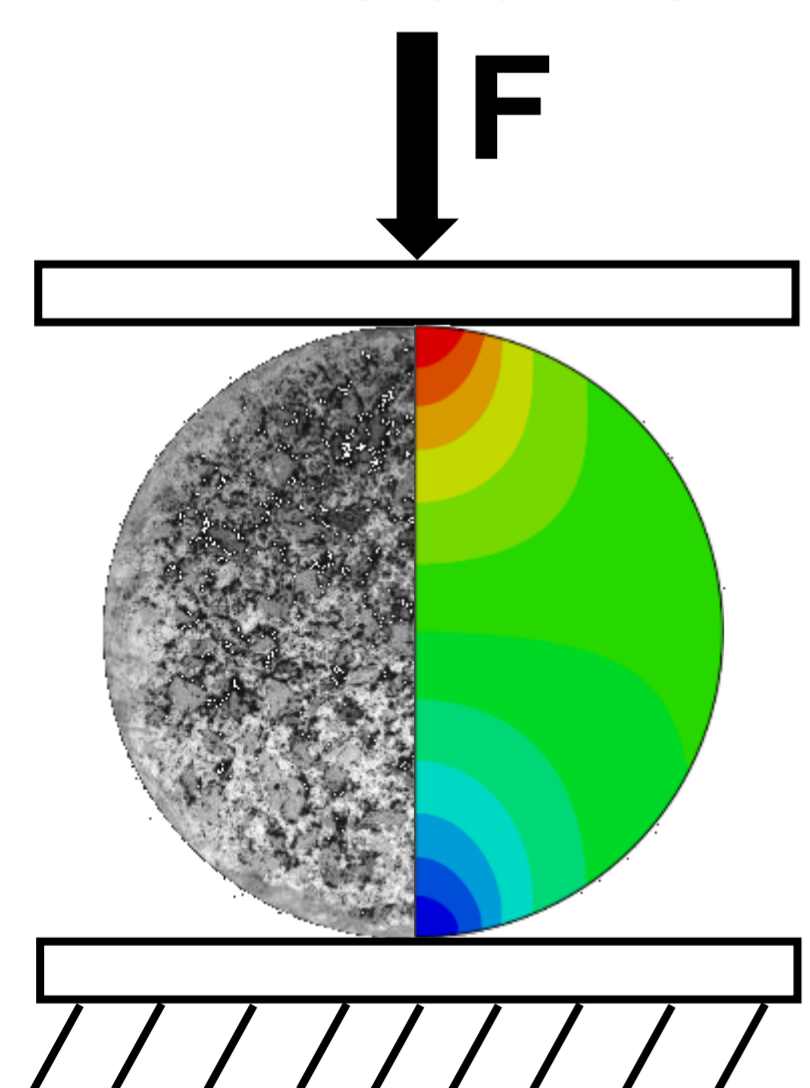
- This work intends to apply the I-DIC technique to the determination of **mechanical properties of refractories**
- Especial emphasis will be given to their **primary and secondary creep** behaviour at **high temperatures**
- It's expected to fully characterize the materials (tension, compression and shear) using a **reduced number of tests**, making use of the Brazilian test

3 – I-DIC algorithm:

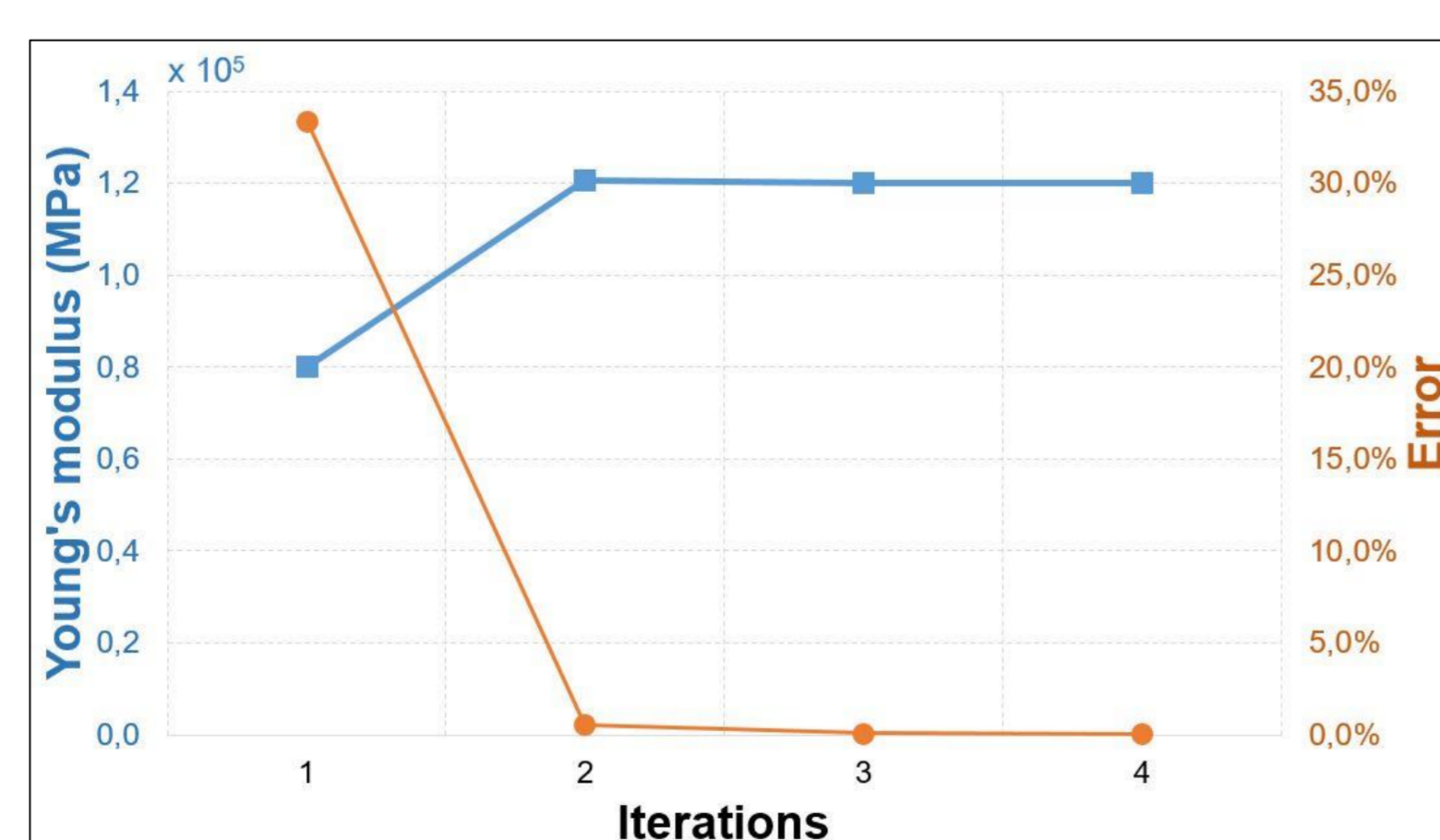
Optimization: **Levenberg-Marquardt Algorithm**



4 – Results:



Linear Elastic Isotropic Model



5 – Conclusions:

- The **I-DIC technique** is a convenient option to perform **inverse identifications**, and the robustness of the **optimization algorithm** related to it plays a decisive role in the obtained results
- For future works, the challenges of the **high temperature I-DIC** will be addressed, and the development of **innovative techniques** related to the images' quality is a priority

ESR Position 09

Supervisors & University

Acknowledgments



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