The NLOAccess framework

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Outline

1. Introduction

Introduction - Key concepts

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Automation

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Virtual Access

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Automation

Virtual Access

User friendliness

2. The NLOAccess framework

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✓ HELAC-Onia is included

3. HELAC-Onia and its web realisation

HELAC-Onia

HELAC-Onia is an automatic matrix element and event generator for heavy quarkonium physics *[H.-S. Shao, Comput. Phys. Commun. 184 (2013) 2562-2570 & Comput. Phys. Commun. 198 (2016) 238-259]*

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- based on NRQCD framework
- based on off-shell recursion relations

HELAC-Onia - Basic methodology

NRQCD factorisation:

$$\sigma(pp \to \mathcal{Q} + X) = \sum_{i,j,n} \int dx_1 dx_2 \, f_{i/p}(x_1) \, f_{j/p}(x_2) \, \hat{\sigma}(ij \to Q\bar{Q}[n] + X) \, \langle \mathcal{O}_n^{\mathcal{Q}} \rangle$$

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- $\langle \mathcal{O}_n^{\mathcal{Q}} \rangle$ are the LDMEs

HELAC-Onia - Main features

- Standard Model calculations but BSM extension is feasible
- different kind of calculation: multiple quarkonia production, event generation, yields vs polarisation, angular distributions of quarkonia decays...
- reweighting method for estimating renormalisation/factorisation scale and PDF uncertainties
- interface with LHAPDF
- interface with PYTHIA 8, QEDPS

HELAC-Onia Web

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- built with Flask Python microframework
- file input as first way to submit a run

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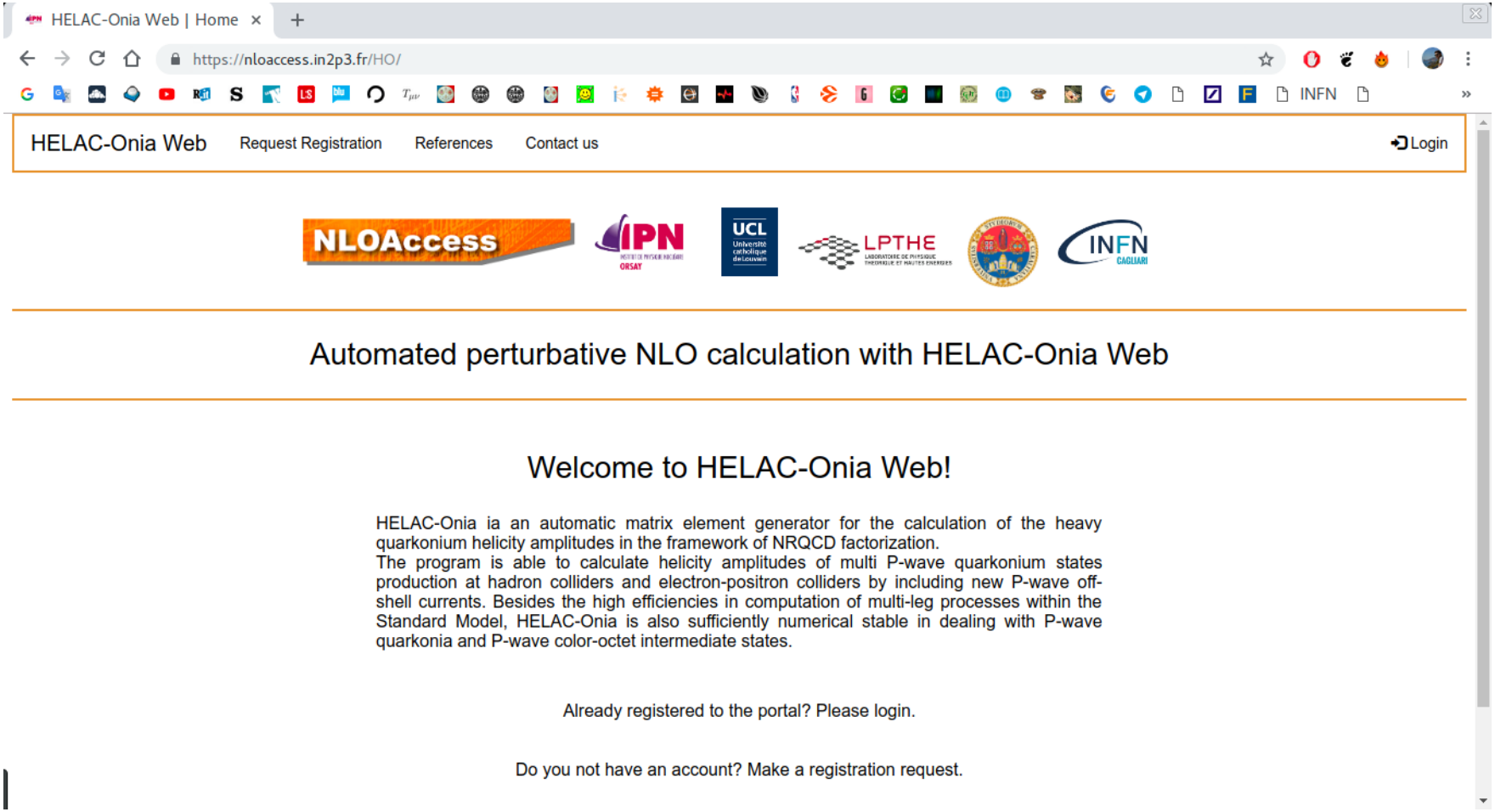
  *online guide still missing

HELAC-Onia Web - Homepage



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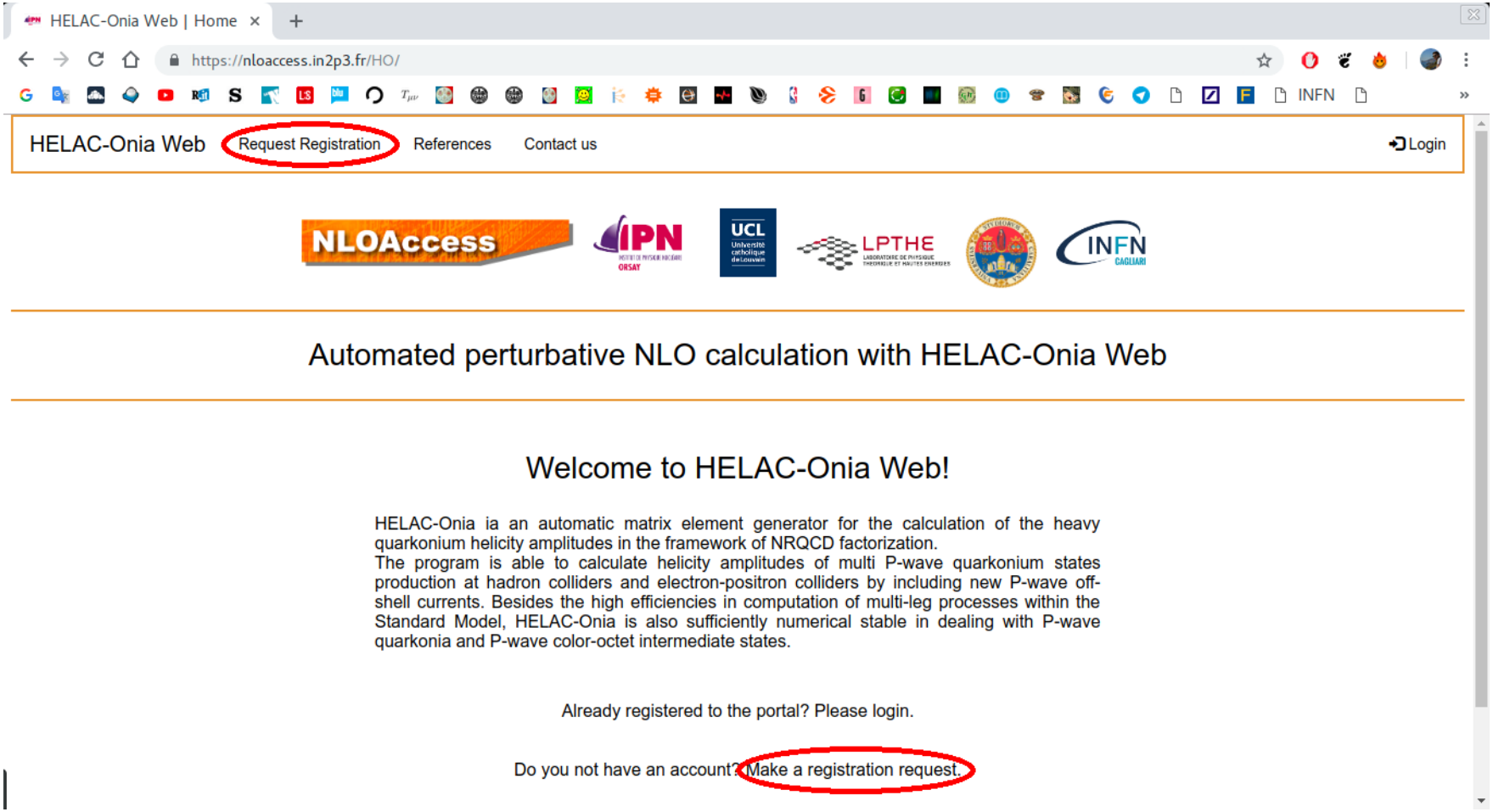

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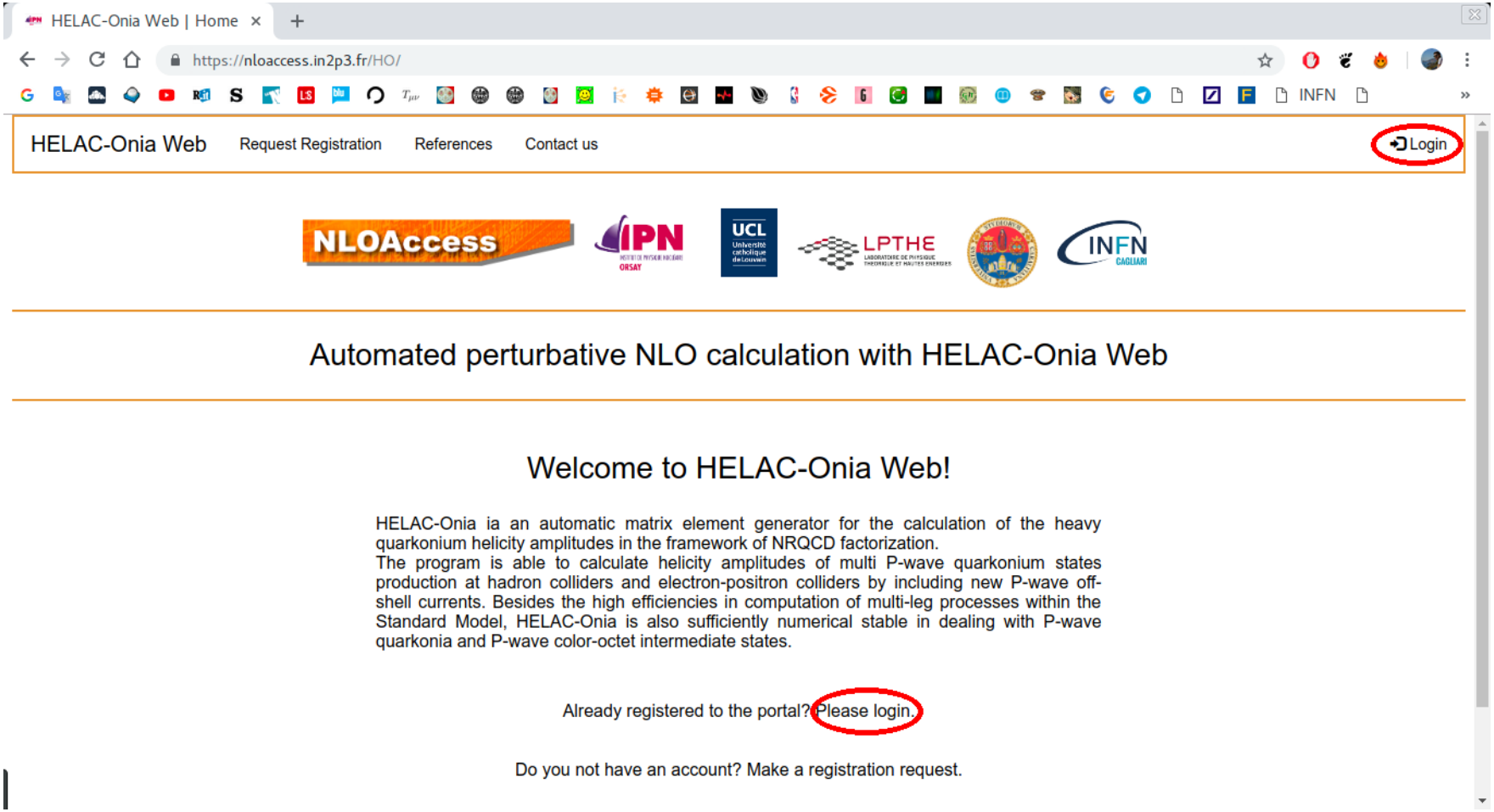

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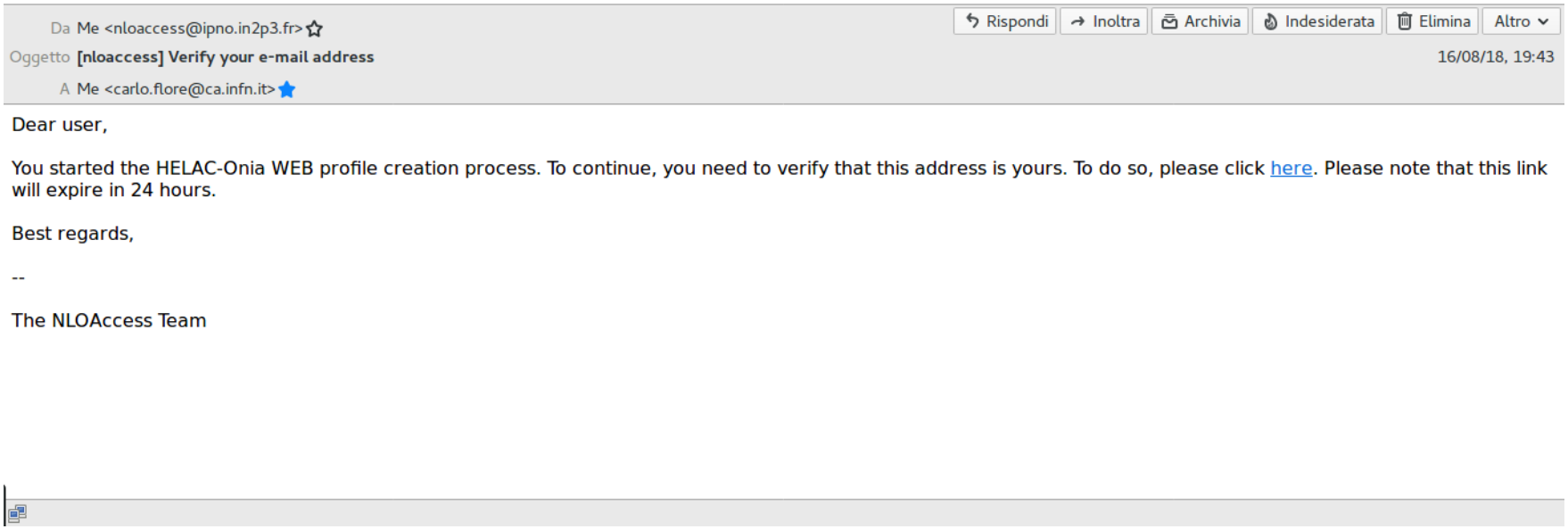

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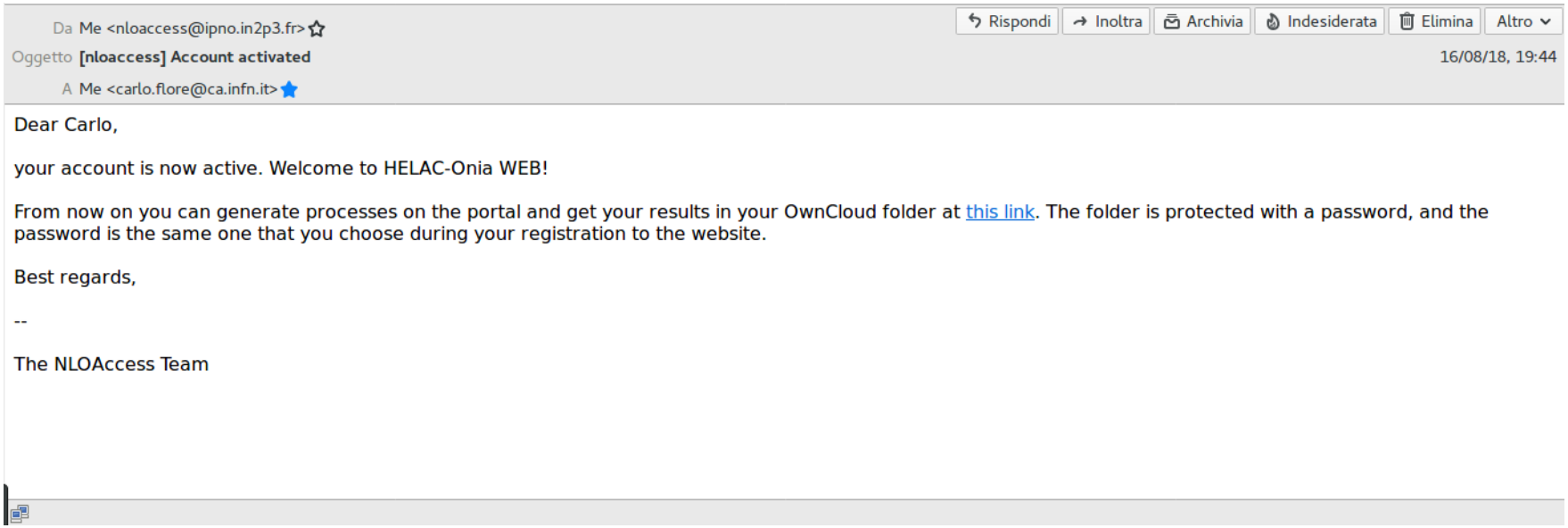

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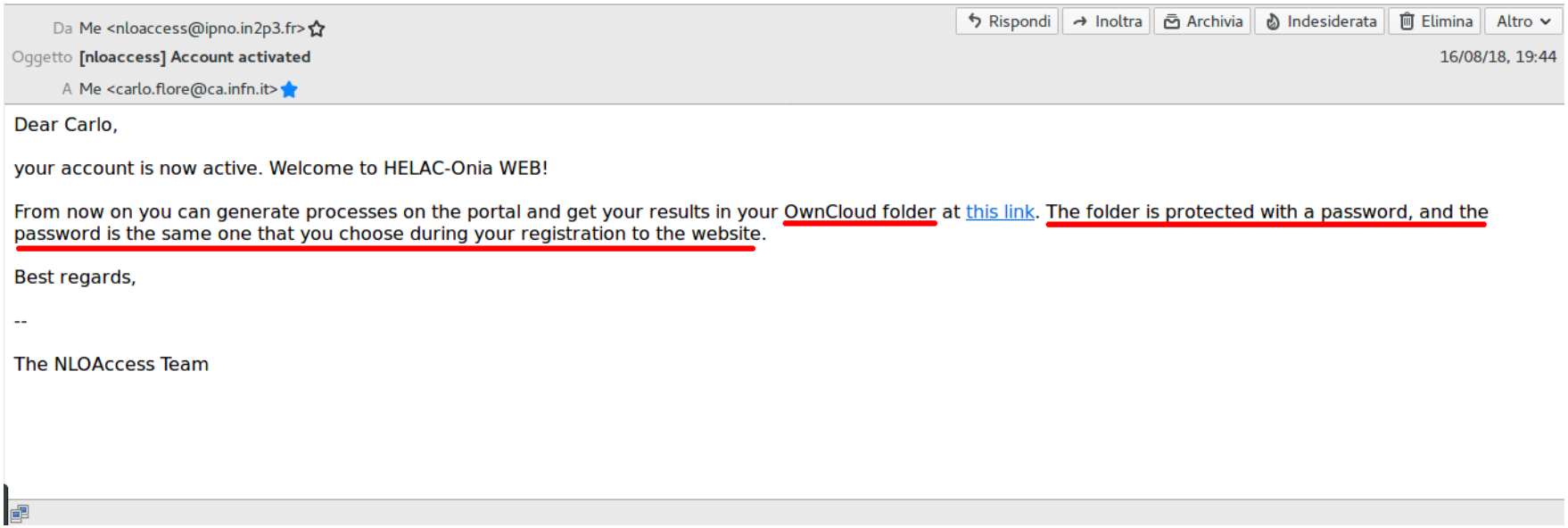

Da Me <nloaccess@ipno.in2p3.fr>
Oggetto **[nloaccess] Account activated**
A Me <carlo.flore@ca.infn.it>

Rispondi | Inoltra | Archivia | Indesiderata | Elimina | Altro

16/08/18, 19:44

Dear Carlo,

your account is now active. Welcome to HELAC-Onia WEB!

From now on you can generate processes on the portal and get your results in your OwnCloud folder at this link. The folder is protected with a password, and the password is the same one that you choose during your registration to the website.

Best regards,

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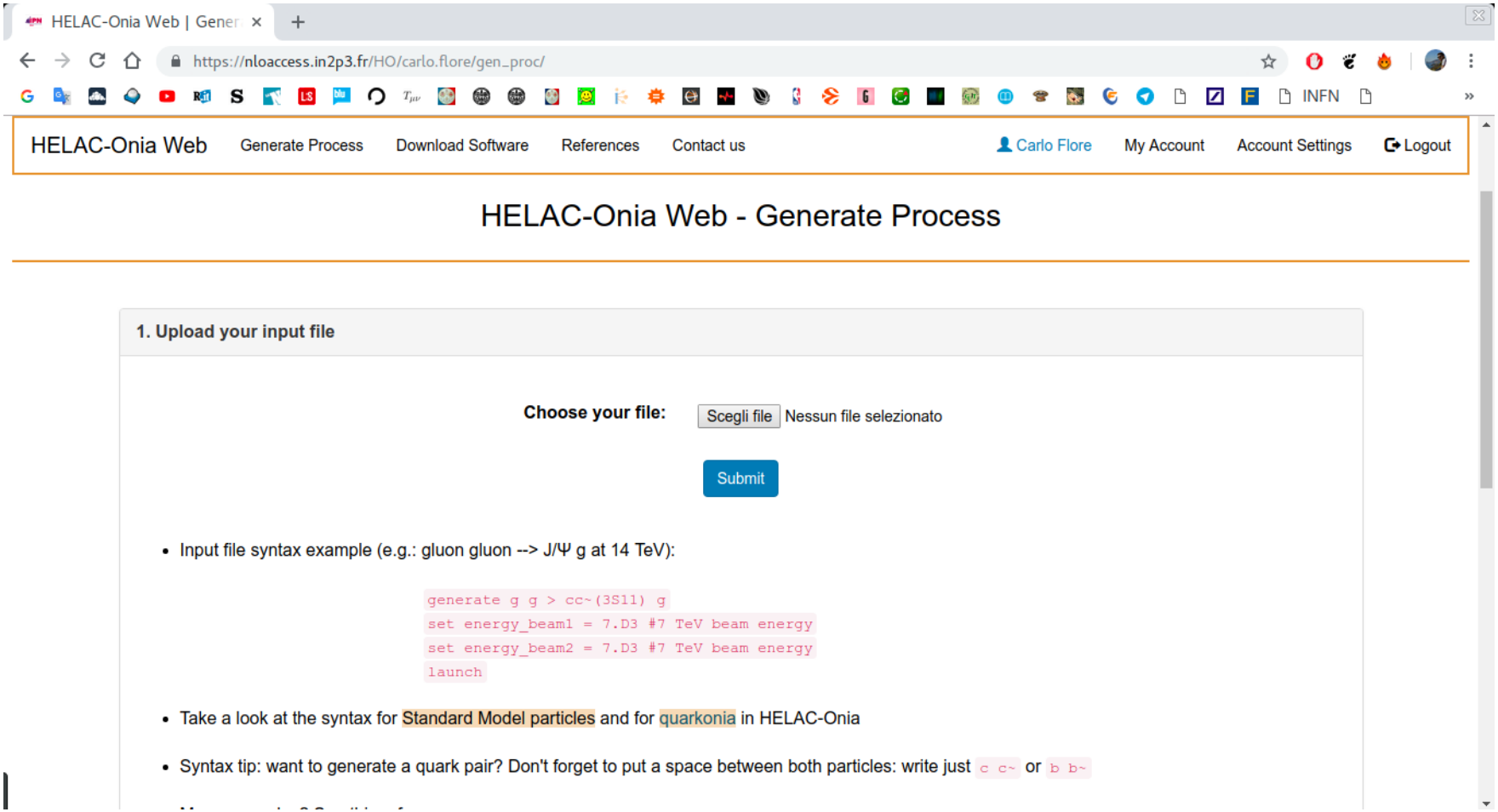
The NLOAccess Team

HELAC-Onia Web - Run submission (I)



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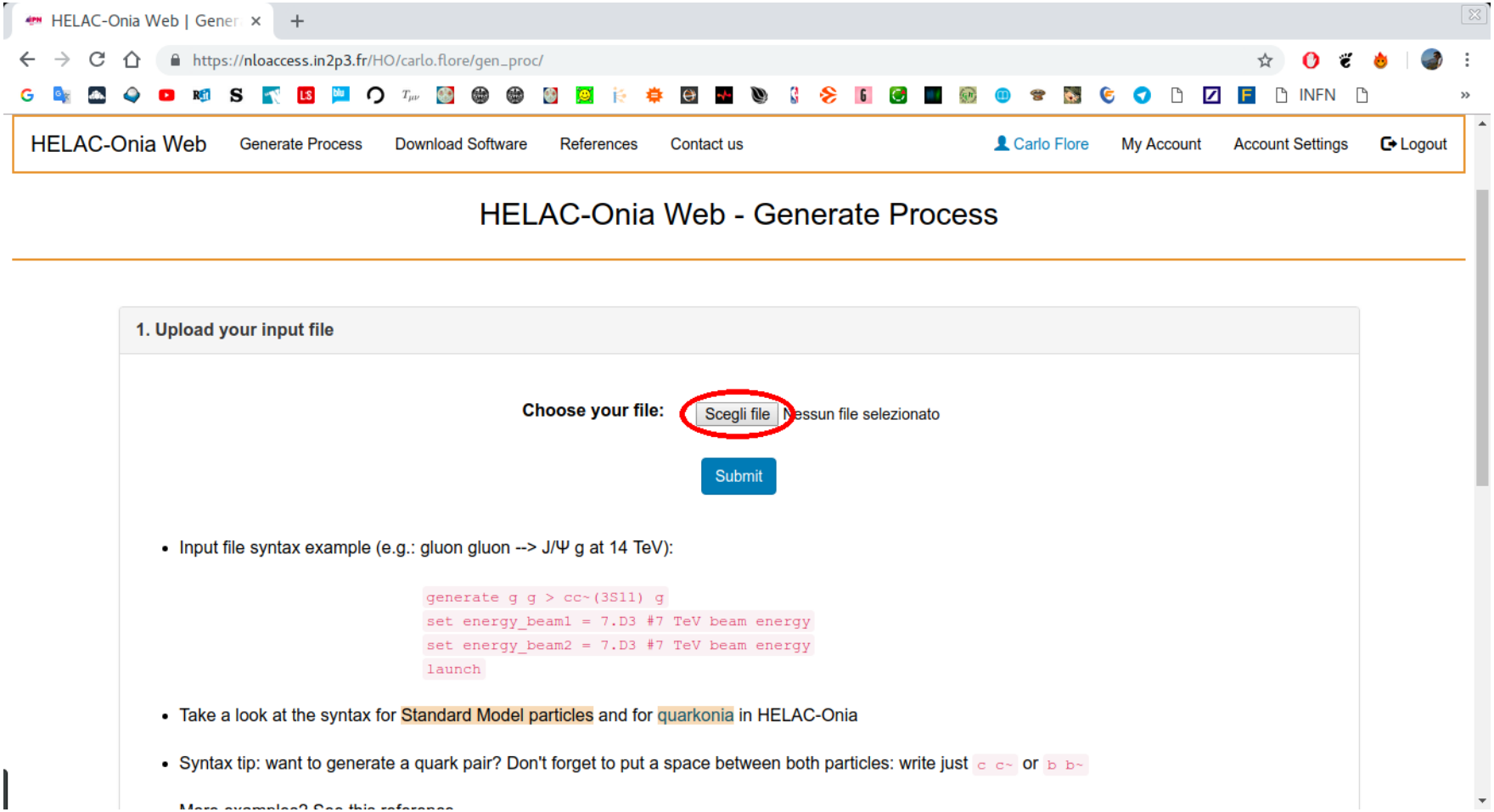

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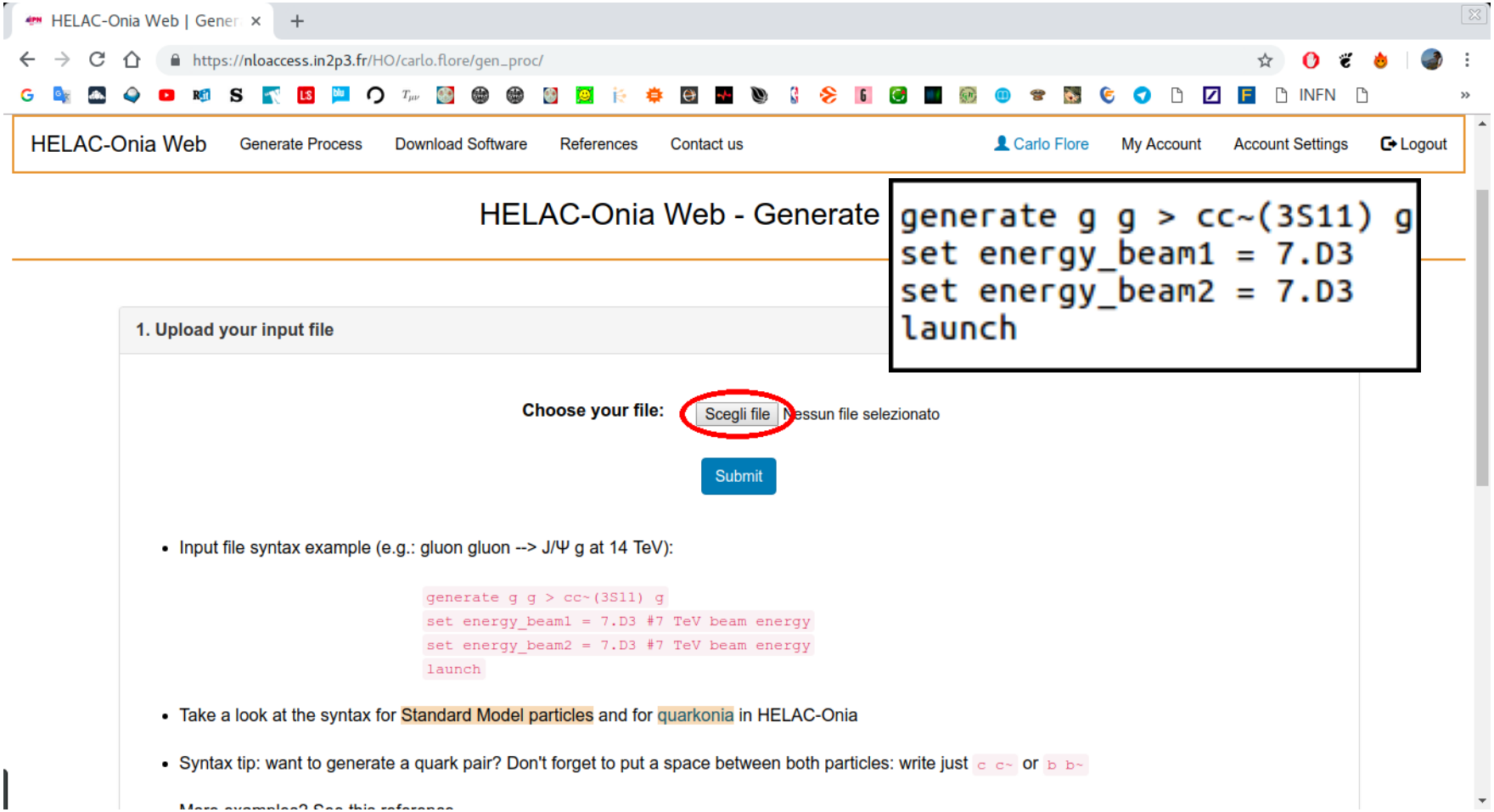
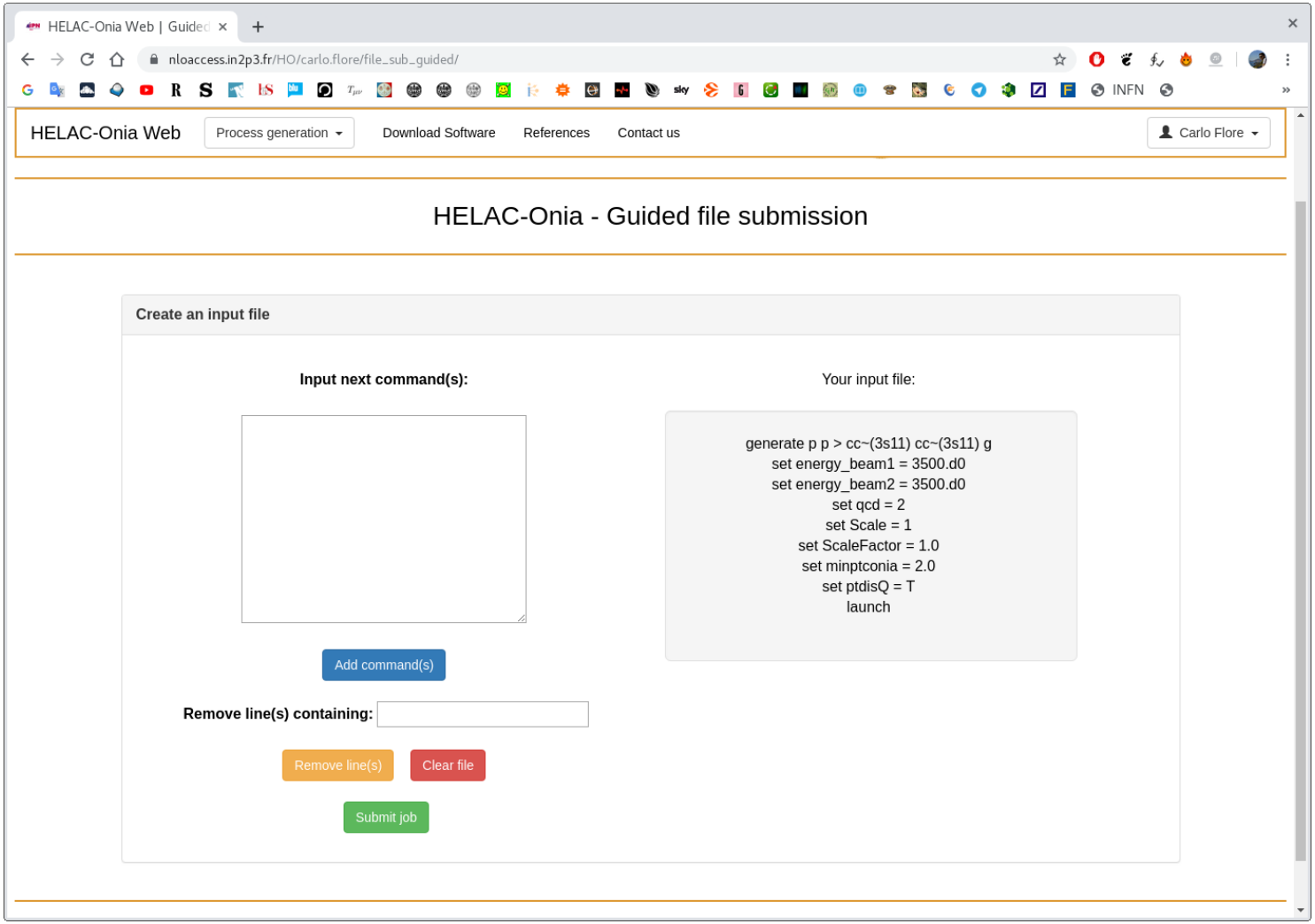
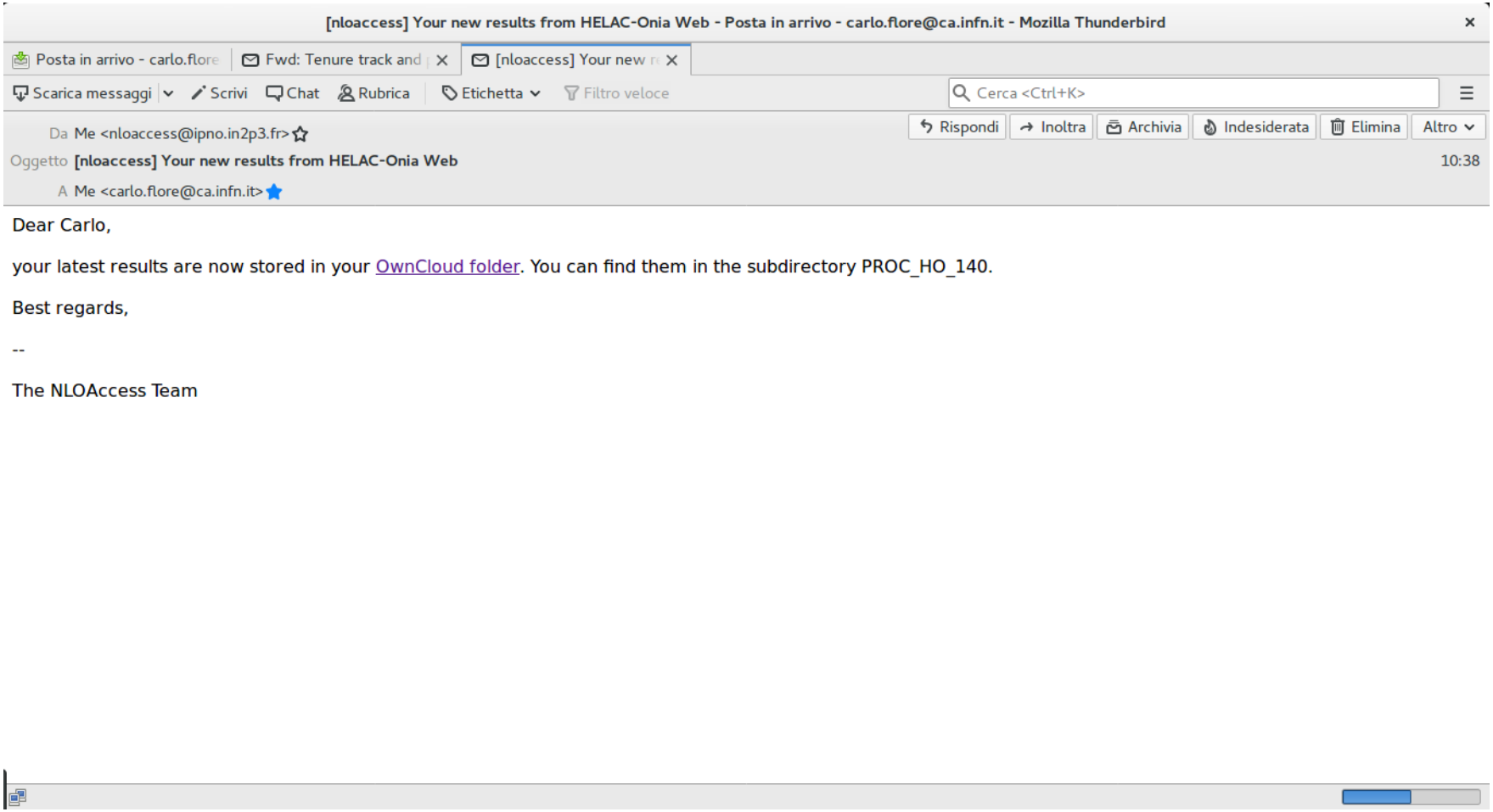


HELAC-Onia Web - Run submission (II)



HELAC-Onia Web - Results



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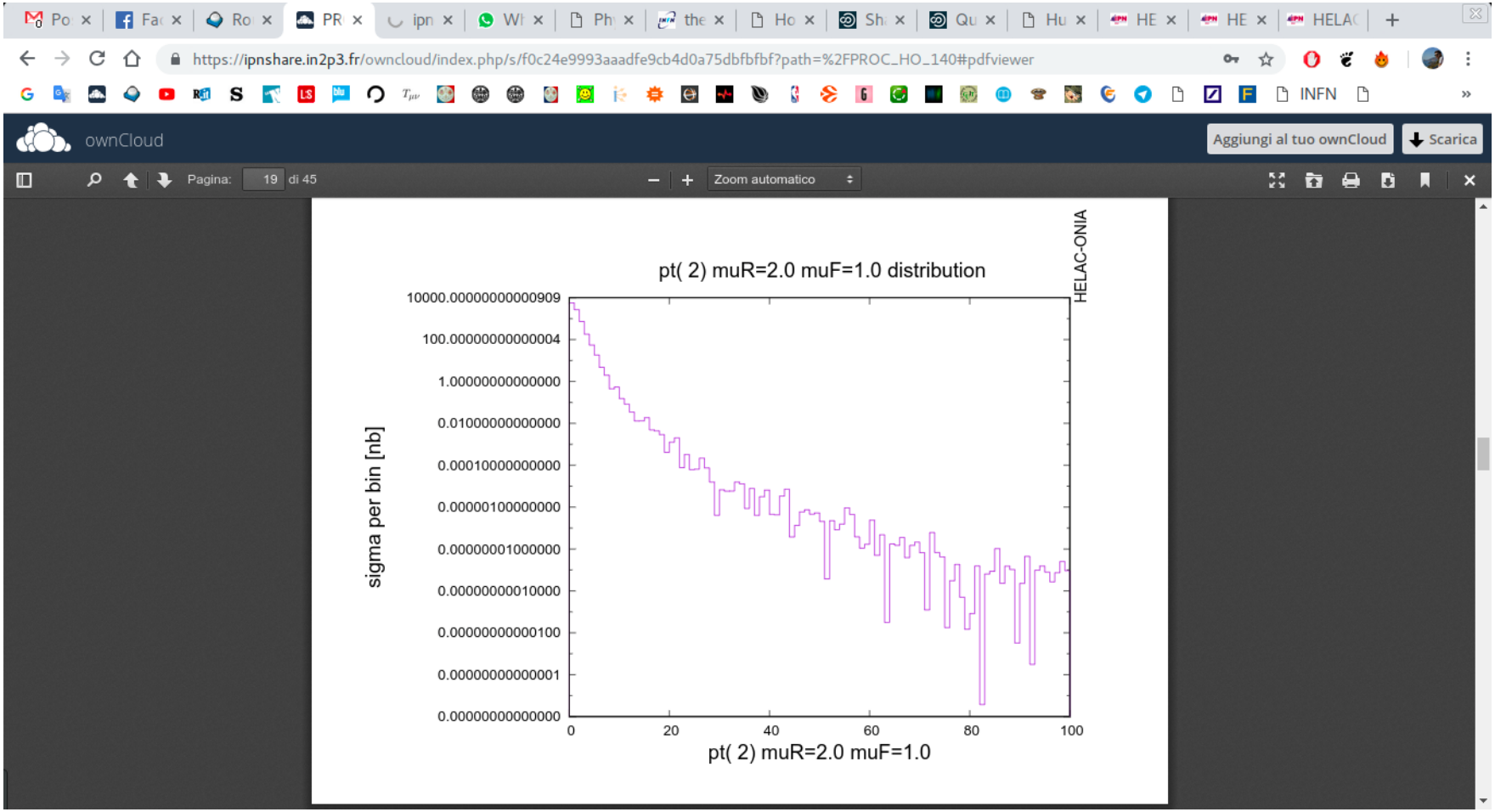
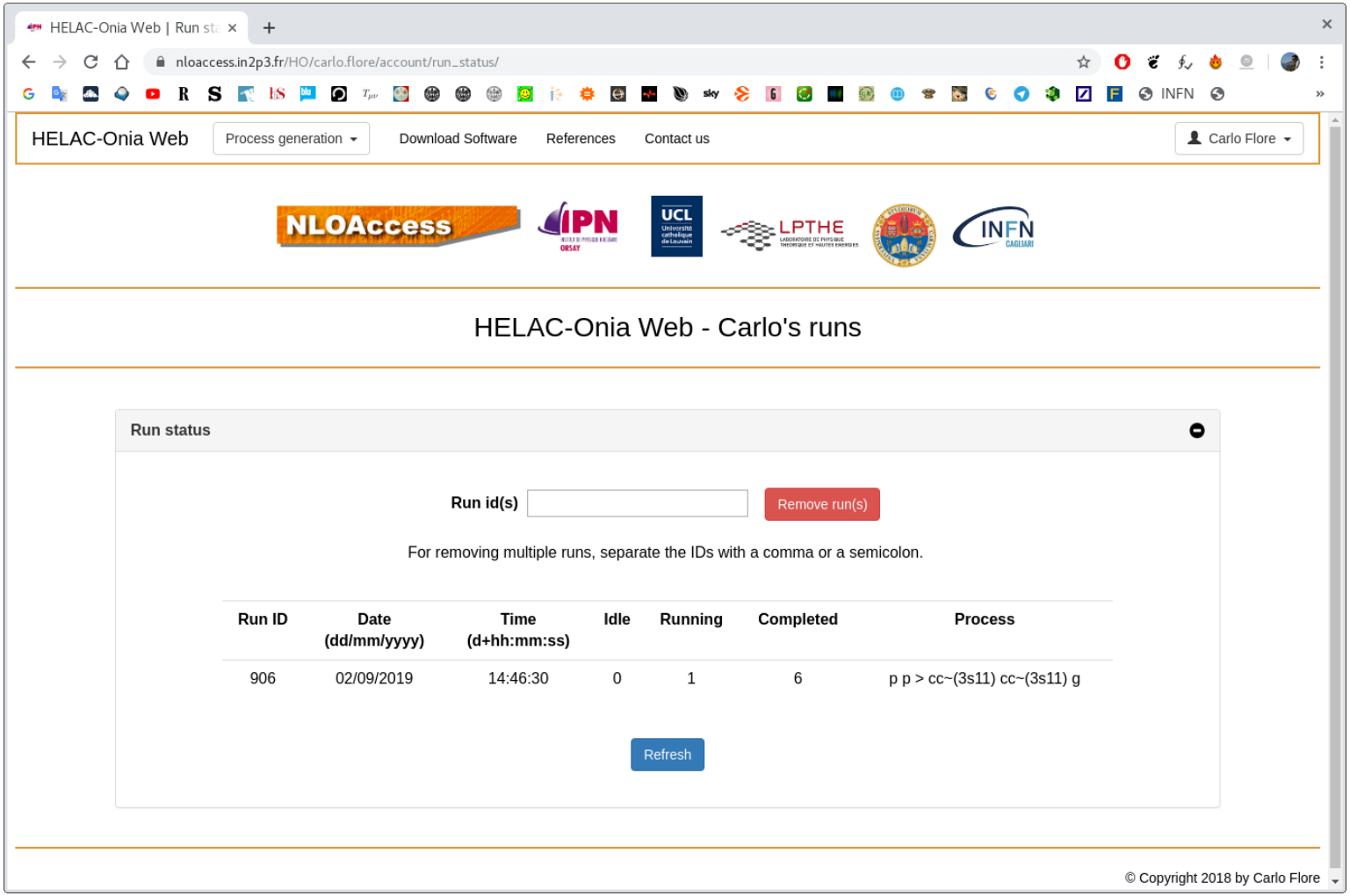


HELAC-Onia Web - Run status and history



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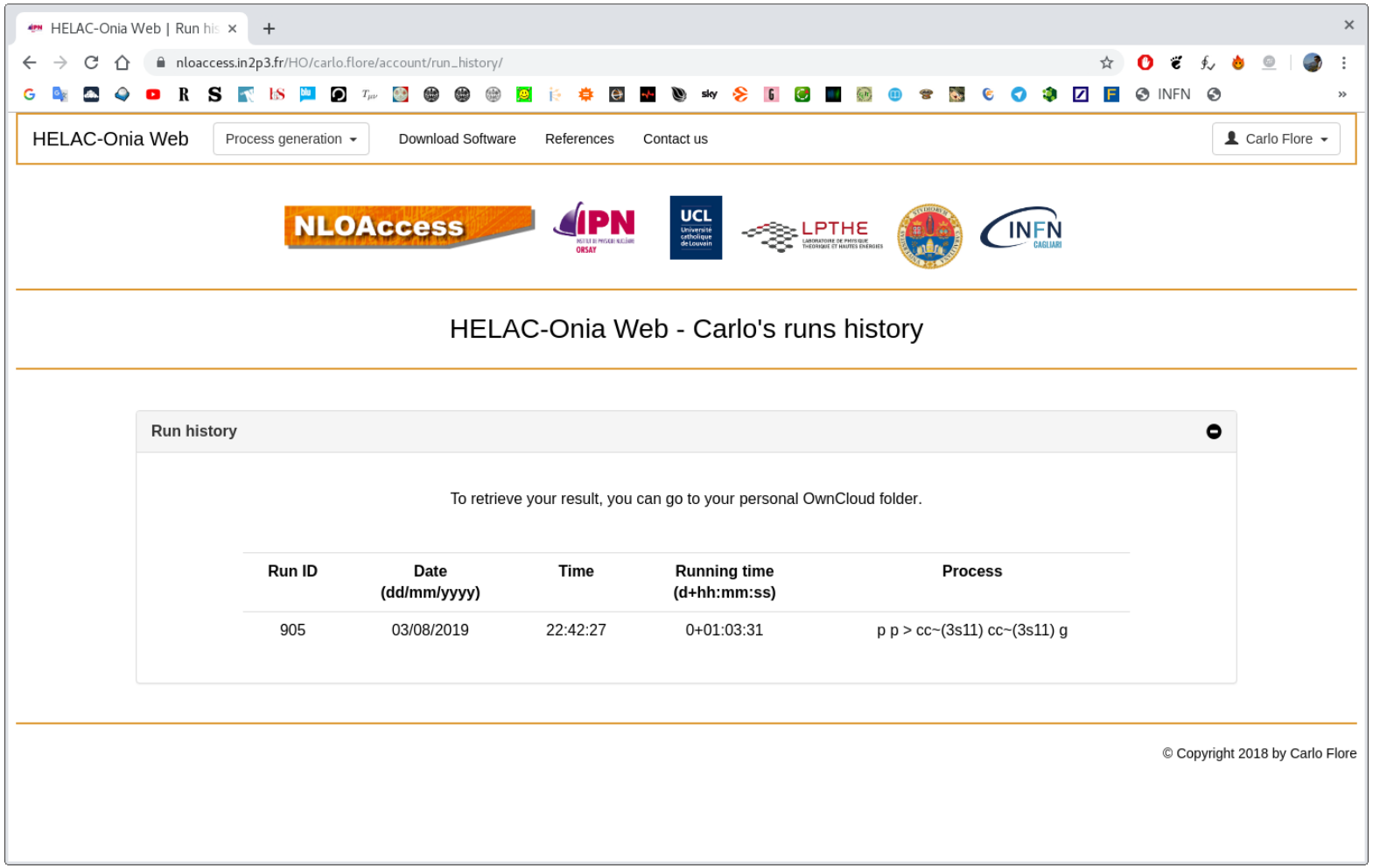

HELAC-Onia Web - User friendliness

User friendliness is a key concept:

- manage registration and run submission via simple procedures
- protected cloud storage is given
- plots are ready to be seen and downloaded
- no CPU cost for the user, just wait for mail updates and get back the results!

4. Conclusions

Conclusions

- NLOAccess:
  - aim to create a single portal for hadronic physics
  - automation and virtual access to a dynamical library
- HELAC-Onia: automated perturbative calculation for quarkonia production
- HELAC-Onia Web: improved portal is online

User feedback is important: improvements will come with your help too!

Thank you

Backup

STRONG-2020

What is STRONG-2020?

- approved for EU Horizon 2020 funding
- 32 Work Packages
- 44 institutions/16 countries
- 7 Transnational Infrastractures (COSY, MAMI, ELSA, GSI, LNF, CERN, ECT*)

HELAC-Onia Web: available PDF sets

The following PDF sets are available for the web version of HELAC-Onia:

- CT10
- CT14LO
- CT14NLO
- CTEQ6L1
- CTEQ66
- nCTEQFullNucMod_208_82
- EPPS16+CT14nlo_Pb208
- NNPDF3.0_NLO_as_0118

References

- HELAC-Onia:
  - "HELAC-Onia: an automatic matrix element generator for heavy quarkonium physics", Hua-Sheng Shao, Comput. Phys. Commun. 184 (2013) 2562 (https://doi.org/10.1016/j.cpc.2013.05.023)
  - "HELAC-Onia 2.0: an upgraded matrix-element and event generator for heavy quarkonium physics", Hua-Sheng Shao, Comput. Phys. Commun. 198 (2016) 238 (https://doi.org/10.1016/j.cpc.2015.09.011)
  - download at http://hshao.web.cern.ch/hshao/helaconia.html
- NLOAccess: https://nloaccess.in2p3.fr
- Flask: http://flask.pocoo.org/