

NA6 LatticeHadrons – progress update

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824093



Overview

Goals of the LatticeHadrons network in STRONG-2020:

- to improve connections between researchers in lattice quantum field theory calculations across Europe via secondments and research exchange visits, emphasising training of young researchers.
- to develop existing and new connections with colleagues working in other domains in strong-interaction physics from both the theory and experimental perspective.
- to share expertise and resources in high-performance computing across the European research community in lattice field theory and develop connections with other domain expertise in HPC.

This plan has been seriously disrupted by the pandemic. Our hope is to use the resources to restart physical topical workshops, research exchanges and secondments as/when we emerge from the pandemic.

Tasks:

1. Co-ordinate research secondments, visits and exchanges
 2. Arrange thematic workshops
 3. Develop software, data sharing and analytic methodologies
- D17.1 Report on the status of research in hadron spectroscopy & structure from lattice QCD
 - D17.2 Report on the status of research in hadrons under extreme conditions
 - D17.3 Report on the status of research in precision QCD and searches for physics beyond the standard model
 - D17.4 Report on the status of research into large-scale numerical simulation of lattice field theory
 - D17.5 White paper – future challenges for lattice QCD and connections with large-scale numerical computing.

Progress to date

- Before the pandemic, successfully hosted an in-person event (Dublin, 5-6th March 2020) to develop a new forum to plan for community access to large-scale supercomputing resources in Europe (EuroHPC)
 - Forum discussions are continuing as new EuroHPC systems come online
- June 2021 – virtual mini-workshop on glueball hunting
 - Tightly focused topic for discussion, involving both lattice QCD, phenomenology and
 - 57 registered participants. Lively and interesting discussions!
- Sept 2021 – collaborated in hosting an ECT* virtual workshop on spectral properties of strongly-correlated systems



European lattice community HPC access town-hall meeting
 5 Mar 2020, 09:00 – 6 Mar 2020, 13:30 [Zoom chat](#)
 Salomon lecture theatre (School of Mathematics, TCD)

Description: To enable competitive scientific communities require access to Tier-0 resources adapted to their needs, EuroHPC presents an opportunity for PNLACE to further advance science by establishing a new community access mode. In addition to the existing resource allocation modes. Towards this goal, the PNLACE Council established a working group to produce a PNLACE white paper on community access.

Lattice QCD is proposed as one of the communities that needs large computational resources. In order that the European lattice QCD community benefits from community access we need to coordinate our activities and be properly implemented. The meeting, open to all in the European lattice community with interest in large-scale numerical simulation aims to start a broad discussion of the opportunities EuroHPC creates and how to best organise to maximise the benefits of Exascale for our scientific projects.

The workshop is supported by the LatticeQCD network of the STRONG-2020 Integrating Activity for Advanced Communities.

Anyone interested is welcome to attend. There is no fee for attendance. Please register using the link below if you intend to come to the meeting.

As the meeting is taking place during the teaching semester, on-campus accommodation is limited. The College is located in the centre of Dublin so there are many hotels close to the campus. A few suggestions are listed [here](#). Frequent buses to the city centre run from the airport.

Online participation is available in a zoom meeting.




The mini-workshop on glueball hunting will be held online on the afternoons of the 1st and 2nd of June, 2021.

The aim of the workshop is to bring together people investigating the properties of glueballs from different angles. Topics to be addressed are the experimental efforts to identify glueballs at colliders, the current status of lattice searches and the use of modern analytical tools.


The workshop is organized as to facilitate the participation of people from different time zones.

The talks will span 40 minutes, followed by 15 minutes discussion sessions.

A zoom link will be sent to registered participants on Monday 31st May



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Core workshops – new timetable

| Topic | Location | Proposed dates |
|-----------------------------------|-------------|--|
| QFT at finite temperature/density | GGI Firenze | 28th March – 1st April 2022 |
| Hadron structure & spectroscopy | Regensburg | Summer 2022 (satellite to Bonn) |
| BSM and precision QCD | Madrid | June 2023 |
| Algorithms & HPC | Edinburgh | April 2023 |

- Deliverables **D17.1 ... D17.4** are reports from these meetings, summarising future directions foreseen by the community based on input from the workshops. These deliverables will be written within 6 months of the physical meetings.
- Deliverable **D17.5**: white paper on future challenges and opportunities will be delivered in month 42.

ExaScale computing and HPC

- Dublin town-hall (March 2020): can the community co-ordinate its approach to access to ExaScale computing in Europe?
- PASC 2022 (Basel, 27th June 2022): proposal going forward for a mini-symposium at the (physical) meeting to review large-scale computing and the data analysis issues raised.



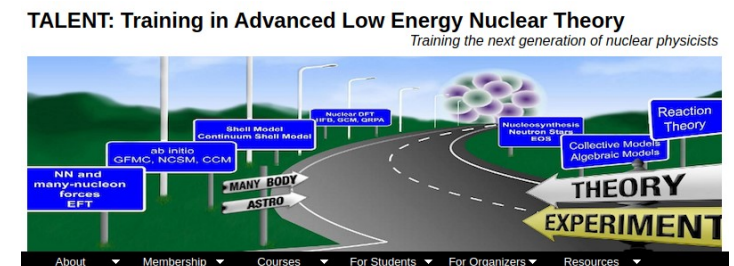
Online training

- **New** activity – developing our new-found expertise at delivering online teaching, tutorials, ...

LaVA

Lattice Virtual Academy

- Starting pointing: co-ordinate existing activity and curate existing material and online resources.
- Develop new material in both “Core” methods along with more topical themes.
- Early-stage support from ECT* Trento.
- Taking inspiration and support from the TALENT programme:
<https://fribtheoryalliance.org/TALENT/>



Summary

- Networking severely disrupted due to pandemic.
- New timetable for the four “Core” LatticeHadrons physical/hybrid workshops, starting early in 2022 (Firenze). Deliverables from the network (reports and white papers) will be completed within six months of the meetings.
- Dublin town-hall meeting started planning for co-ordination across European research institutions for a community approach to access to EuroHPC resources and the ExaScale
- Leverage our newly learned skills in online training to build an online resource for early-stage researcher training into lattice QCD – LaVA. Input and ideas very welcome!