

TA2

Overview

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Discussion Items

- 1) Updates
- 2) Discussion on Fellows, Leadership, and Structure
- 3) IAL Lecture Weeks
- 4) Round Table

TA2 - Computational Physics & Innovative Algorithms Lab

- **Mission: Addresses major computational challenges in CmF**

- Lattice QCD simulations at exascale
- Higher-order perturbative calculations
- Large-scale experimental data analysis (HL-LHC, Belle II), **etc.**

- **Core methods & developments**

- Advanced Monte Carlo (multi-level MCMC, fast MC event generation, lattice)
- Machine Learning for simulation, tracking, PID, and holistic event interpretation
- Tensor Networks, Quantum Computing, and Algorithms for lattice gauge theory
- Computer algebra for higher-loop Feynman integrals, etc.

- **Goals**

- Break computational bottlenecks in RA1-RA4
- Develop fast, scalable algorithms for simulation & inference
- Create shared infrastructure for SMEFT/global fits, etc.

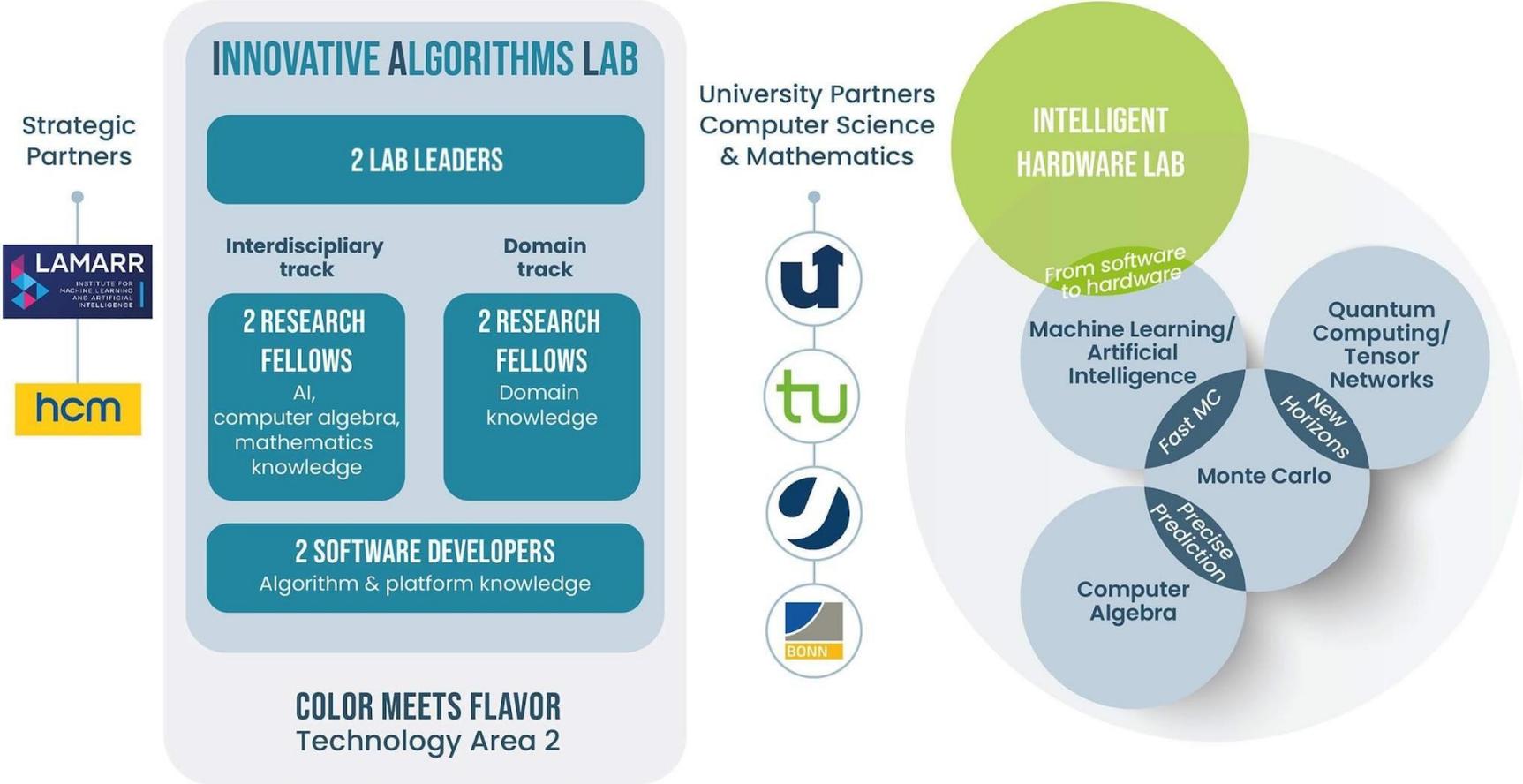
- **Resources**

- W3 Professorship “Computational Physics”
- 4 IAL Fellows + software support
- ~500 k€/year total funding incl. personnel

TA2 Updates

- **Conveners vs. IAL Leaders**
 - There is no room for both: all TA2 activities are IAL centric
 - For now IAL leadership through TA2 conveners until next election cycle
- **CS professorship TUDo**
 - “ML/AI in Physics”, position created, hiring process has started
- **TA2 / IAL membership**
 - Please register for the cmf-ta2 & cmf-ial mailing lists
 - IAL Members: CmF Members with interest in IAL activities (easiest to manage through cmf-ial)
 - IAL Fellows
 - The two RSE
 - IAL Student Member: proposed title for PhD & Master’s students with activities that align with IAL
- **Getting things moving & diversified involvement (CS)**
 1. Starting hiring process of 2 x IAL Fellows
 2. Kick-off for TA2 with project discussion
 3. Workshops - Hackathons - Tutorials - Seminars
 4. Lectures: dissemination through co-opting of existing CS & Comp. Phys., NuMerIQS
 5. IAL Weeks (next slide)

IAL figure (adapted)



+ 25k €/a Budget for the lab

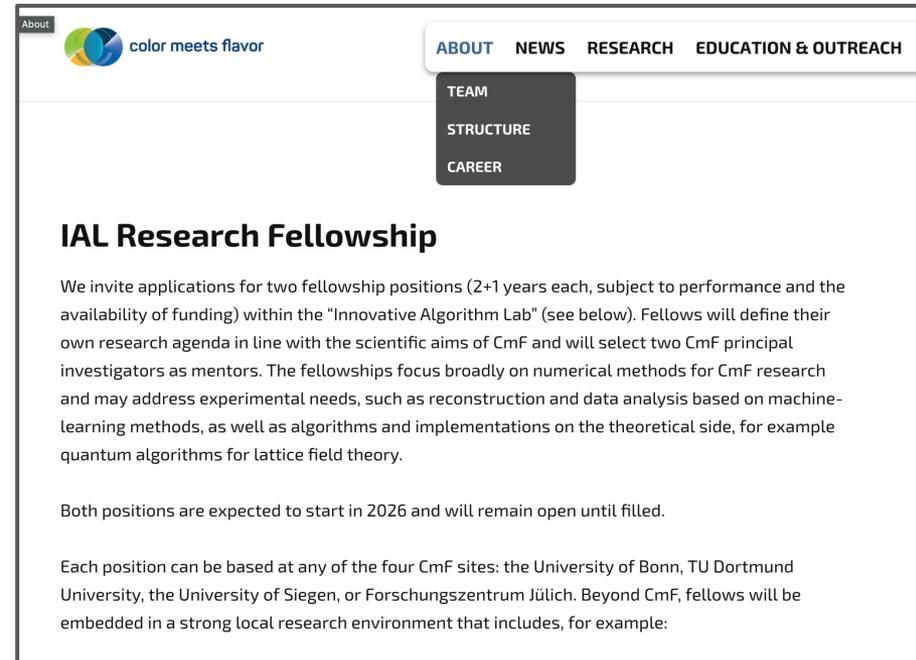
IAL Fellows & IAL RSEs

- Two fellows to be hired this year
- Open background - open location
 - Candidates should have:
 - a PhD in physics, computer science, mathematics, or a closely related field; and
 - an established track record in their chosen field of research.
 - Each position can be based at any of the four CmF sites: the University of Bonn, TU Dortmund University, the University of Siegen, or Forschungszentrum Jülich.
- Will go out to inspire, latticejobs, ...
- Webpage for job offer (thx Maik):
<https://color-meets-flavor.de/about/career/ial-research-fellowship>
- We have circulated the text.
- RSEs: TUDo settled; what about UBo?
 - RSEs are the “institutional memory” of the IAL
 - long term support & development beyond the 2+1 yr Fellows
 - Can we find funds? UBo Rectorate appears disinclined to acquiesce to a request
 - Any ideas on how we could find a tag? Only through the extension proposal?
 - Some activities such as RDM are not optimally suited for a non-permanent person

IAL Fellows

Selection process needs to be clarified

- Interview committee from CmF PIs and partners from CS/Math?
- Selection criteria:
 - Connection to two cluster PIs research interests, but how do we communicate the research interests of CmF to the applicants?
 - Could be part of the application process or the discussion later?



The screenshot shows the website for 'color meets flavor'. The navigation menu includes 'ABOUT', 'NEWS', 'RESEARCH', and 'EDUCATION & OUTREACH'. A dropdown menu is open under 'ABOUT', showing 'TEAM', 'STRUCTURE', and 'CAREER'. The main content area is titled 'IAL Research Fellowship' and contains the following text:

We invite applications for two fellowship positions (2+1 years each, subject to performance and the availability of funding) within the "Innovative Algorithm Lab" (see below). Fellows will define their own research agenda in line with the scientific aims of CmF and will select two CmF principal investigators as mentors. The fellowships focus broadly on numerical methods for CmF research and may address experimental needs, such as reconstruction and data analysis based on machine-learning methods, as well as algorithms and implementations on the theoretical side, for example quantum algorithms for lattice field theory.

Both positions are expected to start in 2026 and will remain open until filled.

Each position can be based at any of the four CmF sites: the University of Bonn, TU Dortmund University, the University of Siegen, or Forschungszentrum Jülich. Beyond CmF, fellows will be embedded in a strong local research environment that includes, for example:

<https://color-meets-flavor.de/about/career/ial-research-fellowship>

Fellow Staging Scheme

2026

2(+1)* year scheme

	Q12	Q34												
Fellow 1	1													
Fellow 2	2													
Fellow 3			3											
Fellow 4			4											
Fellow 1 CmF2														
Fellow 2 CmF2														
FTE	2		4		4		4		4		4		4	

*the +1 is not shown, but would imply that we would postpone the hiring of e.g. one or more fellows

IAL Weeks

- What format? Hackathon, lecture series, training?
- When? Semester break? Fall (Fellows could assist)
- Proposal for a 1st iteration:
 - Practical use of AI/ML tools in personal workflows:
 - Text (paper, proposal, report; legality)
 - Coding
 - Analysis
 - Workflow manager (compute/analysis)
 - CI/CD
 - What tools exist, what are available at the cluster sites
 - What tools should/have to be procured
 - Local expertise? Lamarr, NuMeriQS, JSC, CmF Members, ...
- Location? Retreat somewhere vs. CmF sites

IAL Operations

- Fellows are not co-located
- IAL leadership neither
- How does the virtual lab cohere?
 - Shared days at one location?
→ desks, offices?
 - Does CmF need a co-working space at every cluster site?
 - Transport & Sustainability
 - “Just” an weekly IAL zoom probably won't cut it.. → Augmented meeting rooms
 - IAL on-boarding retreat?
 - All IAL?
 - Fellow & Mentor(s)?
- Regular events
 - Paper reading clubs?
 - IAL Student Members to prop up numbers?