

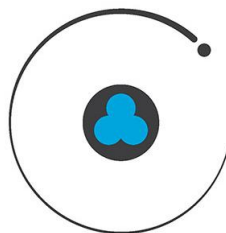


HELSINKI INSTITUTE
OF PHYSICS

HIP THEORY PROGRAMME

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HELSINKI INSTITUTE OF PHYSICS

2026

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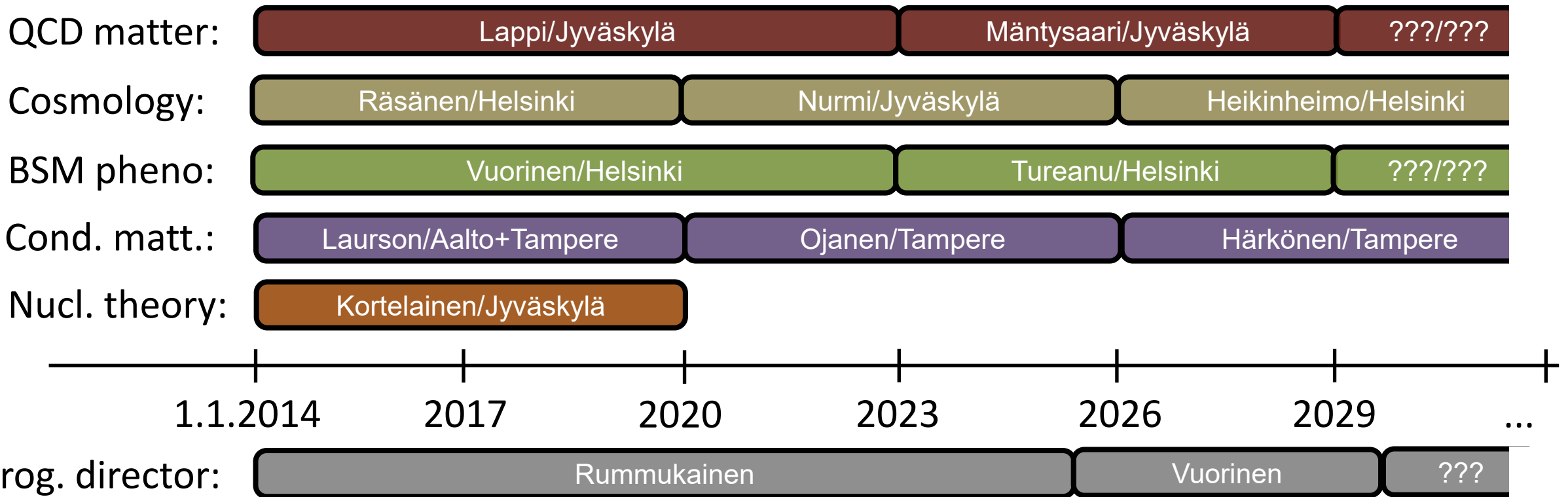
Matti Kalliokoski

HIP Theory Programme:

- Currently, theory programme $\approx$ four 3+3-year fully independent projects
- Dual impact: Strengthening Finnish (theoretical) physics + boosting PI careers
- Complementary to experimental activity, but independent in choice of topics

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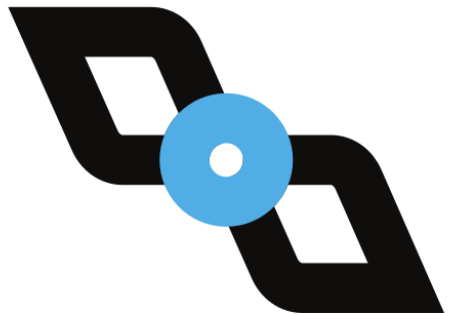


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- Very successful track record with high-impact research and several project leaders obtaining ERCs or permanent positions during project duration

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- Very successful track record with high-impact research and several project leaders obtaining ERCs or permanent positions during project duration
- Amazing past 12 months: Theory programme members secured
 - New Centres of Excellence in Neutron-Star Physics (director AV) and Quantum Materials (PI Ojanen) – both with budgets exceeding 10M€
 - ERC Consolidator (Paatelainen) and Advanced (AV) grants on QCD topics
 - New full professorship at the University of Turku (Paatelainen)



Centre of Excellence
neutronstars.fi



Current projects in second term (1.1.2023-):

Phases of Strongly Interacting Matter:

- Three main themes: 1) QCD evolution & heavy-ion physics; 2) Equation of State of dense matter; 3) Holography
- Strong collaboration between different HIP universities; affiliated with two Centres of Excellence
- Very active student output; 8-9 new PhDs in 2026 alone

Fundamental Particle Interactions Beyond the Standard Model:

- Broad programme on phenomenological and theoretical challenges in BSM physics: CPT, dark matter, neutrinos,...
- Highly successful research output; recently, e.g., significant steps towards a deeper understanding of neutrino oscillation



Heikki Mäntysaari



Anca Tureanu

Current projects in first term (1.1.2026-):

Theoretical Cosmology and Astroparticle Physics:

- Strong collaborative aspect: Particle cosmology and GW physics (mostly) in Helsinki; inflationary physics in Jyväskylä
- Active participation in COSINUS experiment through unique collaboration between particle and materials physicists
- Exciting times ahead: first COSINUS science run in 2026!

Pioneering Beyond Born-Oppenheimer Physics of Solids:

- Emerging research group tackling major challenge in solid-state physics: relaxing the ubiquitous Born-Oppenheimer approximation in an *ab-initio* numerical approach
- Several successful new hires; Aleksi Hartikainen won the best MSc thesis award from the Finnish Physical Society



Matti Heikinheimo



Ville Härkönen 8

Positives:

- Theory programme continues to play an important role in Finnish theoretical physics, boosting the careers of young PIs
- Outstanding track record in identifying the right people: Many ERC grants, tenure-track positions, and high-impact research

Main challenge:

- Gradual decrease in funding: Programme budget has remained ~same for long, but now amounts to much less due to inflation

Questions to IAC members:

- Should the # of projects be cut again, or can we change sth else?
- Are the current project topics optimal?