

Pushing the Boundaries of the Energy and Intensity Frontiers

Searching for New Physics at the HL-LHC and Beyond

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**The race for the longest
workshop title is on**

Welcome and Thank-You

A warmest welcome to all participants –

Thank you for joining us at this busy time of the year
And while the World Cup is on!



And thank you especially to the speakers –

We know we didn't give you a straightforward remit

A special thanks goes to IPPP –

For the hospitality and for generously funding this
workshop through the 2017-18 Associateship
programme

(<https://www.ippp.dur.ac.uk/ippp-associateships>)

Why This Workshop?

It feels like it is the right time to take stock of where we are in the search for BSM physics at colliders

And to check the route along the way

Making sure that we have the right navigation toolkit



We live in interesting times...

The LHC Run-2 is coming to an end

Some intriguing hints, but no signs of vanilla-type BSM physics

New physics may well be just around the corner, but easy to find it ain't

The HL-LHC is firmly on the horizon

Less than a decade away!

DUNE
expected
start date



Remember this?



Talks of a new collider do not seem that far-fetched anymore

“From 9 to 13 April, some **500 scientists from 147 institutes** met in Amsterdam for the 2018 Future Circular Collider (FCC) week. This **fourth** annual meeting of the **FCC collaboration** offered a vibrant space to discuss the latest research results and present technological breakthroughs that could pave the way for a new large-scale research infrastructure.”

(Source: <https://home.cern/cern-people/updates/2018/05/discussing-future-colliders-fcc-week-2018>)

It matters to be talking about this now!

<https://council.web.cern.ch/en/content/european-strategy-particle-physics-update-2018-2020>

Aims and Format

In organizing this workshop, we have tried to steer away from the more traditional format with lots of detailed “review talks” –

There is plenty of meetings of this kind and we didn’t want to duplicate

Instead, we have chosen to have fewer but longer talks, leaving ample time for discussion

Speakers have been invited to present results and challenges giving a personal steer to their reflections and considerations

We want your insights!

Workshop Programme

Day 1

**Overview of
Experimental and
Theoretical Landscape**

Day 2

**Standard Model
Overview**

**Flavour (including
anomalies)**

**BSM (status and
prospects)**

**Experimental
challenges and
techniques**

Day 3

Modelling Uncertainties

PDFs

Workshop Programme

Day 1

14:00	Welcome and workshop introduction	Alexandre De Santo et al.
	Open Centre	14:00 - 14:30
15:00	Summary UK European Strategic meeting	Shawn Harrison
	Open Centre	15:00 - 15:30
	LHC physics overview	Sam Healy
16:00	Open Centre	16:00 - 16:30
	Coffee break	16:30 - 16:45
	Open Centre	16:45 - 16:55
	BSM exercises (including physics beyond colliders)	Michael Sparrow
17:00	Open Centre	17:00 - 17:30
	Discussion	
18:00	Open Centre	17:30 - 18:00

Day 2

09:00	Higgs theory	Francesco Rig
	Open Centre	09:00 - 09:30
10:00	QCD theory	Andrew Bond
	Open Centre	09:30 - 10:00
	Coffee break	10:00 - 10:30
11:00	Open Centre	10:30 - 10:45
	Flavour anomalies and rare decays	Alexander Carr
	Open Centre	10:45 - 11:00
12:00	Precision Flavour Physics	Ulf-G. Meier
	Open Centre	11:00 - 11:30
	Buffer lunch	11:30 - 12:30
13:00	Open Centre	12:30 - 13:00
14:00	Flavour Theory + Discussion	Sebastian Jager
	Open Centre	14:00 - 14:30
15:00	BSM searches at colliders - status	Thomas Leif
	Open Centre	15:00 - 15:30
	Coffee break	15:30 - 15:45
	Open Centre	15:45 - 16:00
	BSM searches at colliders - prospects	Monica D'Onofrio
17:00	Open Centre	16:00 - 17:00
	BSM searches at colliders - limitations from experimental uncertainties, new techniques	Jon Brooks
	Open Centre	17:00 - 18:00

Day 3

09:00	Standard Model theory (EW and Top)	Jonas Lindert
	Open Centre	09:00 - 09:45
10:00	Photon Shower and tools	Frank Krauss
	Open Centre	09:45 - 10:30
	Coffee break	10:30 - 10:45
	Open Centre	10:45 - 11:00
11:00	PDF theory	Stefano Forte
	Open Centre	11:00 - 11:45
12:00	PDF: the pathway to the BSM searches of the future	Amanda Cooper-Saikat
	Open Centre	11:45 - 12:30

We look forward to lots of
fruitful discussions