



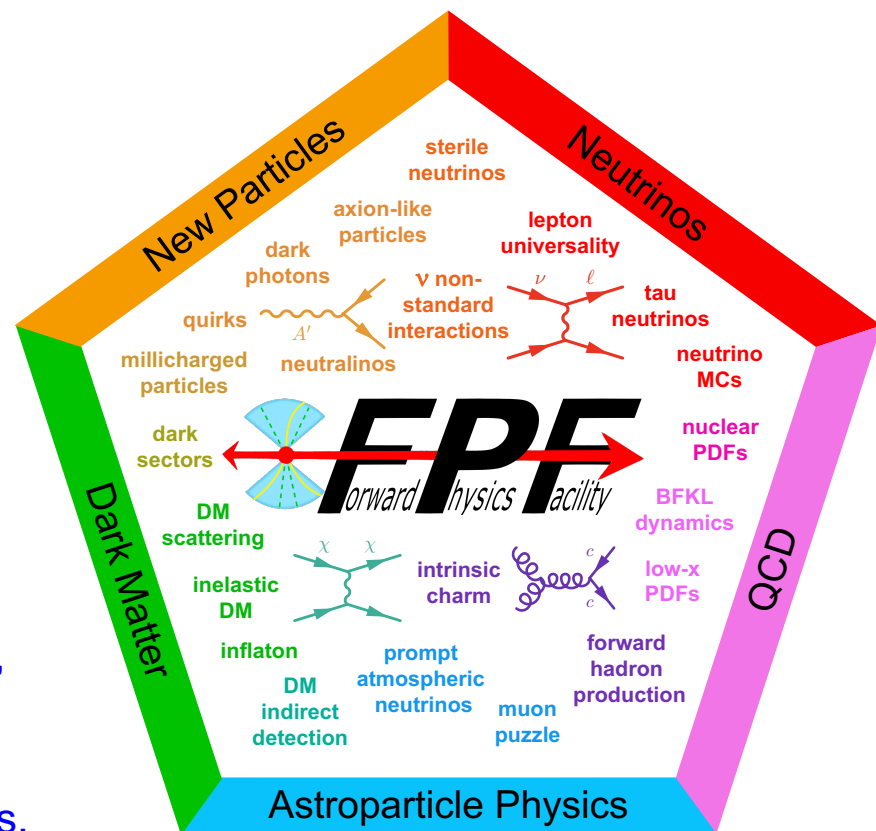
WELCOME AND INTRODUCTION

7th Forward Physics Facility Meeting, CERN

Jonathan Feng, UC Irvine, 29 February 2024

WELCOME

- This is the 7th in a series of meetings held every ~6 months since 2020.
- These meetings bring together the FPF community, including multiple CERN technical teams, ~300 experimentalists on pathfinder experiments, and ~200 theorists with important contributions.
- FPF Meetings
 - [FPF Kickoff Meeting](#), 9-10 Nov 2020
 - [FPF2 Meeting](#), 27-28 May 2021
 - [FPF3 Meeting](#), 25-26 Oct 2021
 - [FPF4 Meeting](#), 31 Jan-1 Feb 2022
 - [FPF5 Meeting](#), 15-16 Nov 2022
 - [FPF6 Meeting](#), 8-9 June 2023
 - [FPF Theory Workshop](#), 19-20 Sept 2023
- FPF Papers
 - FPF “Short” Paper: 75 pages, 80 authors, Phys. Rept. 968, 1 (2022), [2109.10905](#).
 - FPF White Paper: 429 pp, 392 authors + endorsers representing over 200 institutes, J. Phys. G 3, 030501 (2023), [2203.05090](#).



ORGANIZATION

- Many opportunities for new participants, new ideas. The meeting is organized to catalyze discussion and interaction; please ask questions, reach out.

Steering Committee: Jamie Boyd, Albert De Roeck, Milind Diwan, Jonathan Feng

WG0 Facility: Jamie Boyd

WG5 FASER2: Alan Barr, Josh McFayden, Hide Otono

Physics WGs

WG1 Neutrino Interactions: Juan Rojo

WG2 Charm Production: Anna Stasto

WG3 Light Hadron Prod: Luis Anchordoqui, Dennis Soldin

WG4 BSM: Brian Batell, Sebastian Trojanowski

Detector WGs

WG6 FASERnu2: Aki Ariga, Tomoko Ariga

WG7 FLArE: Jianming Bian, Milind Diwan

WG8 AdvSND: Giovanni De Lellis

WG9 FORMOSA: Matthew Citron, Chris Hill

WG Liaisons	WG5 FASER2	WG6 FASERnu2	WG7 FLArE	WG8 AdvSND	WG9 FORMOSA
WG1	Josh McFayden	Aki Ariga, Tomoko Ariga	Steve Linden, Wenjie Wu	Antonia Di Crescenzo	Matthew Citron
WG2	Josh McFayden	Aki Ariga, Tomoko Ariga	Steve Linden, Wenjie Wu	Antonia Di Crescenzo	Matthew Citron
WG3	Josh McFayden	Aki Ariga, Tomoko Ariga	Steve Linden, Wenjie Wu	Antonia Di Crescenzo	Matthew Citron
WG4	Josh McFayden	Aki Ariga, Tomoko Ariga	Steve Linden, Wenjie Wu	Cristovao Vilela	Matthew Citron

FPF WEBPAGE

- We have a new webpage: <https://fpf.web.cern.ch>.
- To add papers, talks, or other content, fill out the “Web Updates” form.



CERN Accelerating science

Sign in Factory

FPF forward physics facility

THE FACILITY ▾ EXPERIMENTS ▾ PHYSICS ▾ PAPERS TALKS EVENTS ORGANIZATION PRES WEB UPDATES

The **Forward Physics Facility (FPF)** is a proposed new underground cavern at the Large Hadron Collider (LHC) that will host a suite of new experiments during the High-Luminosity LHC (HL-LHC) era. The existing large LHC detectors have un-instrumented regions along the beam line, and so miss the rich physics opportunities provided by the enormous flux of particles produced in the far-forward direction. Without the FPF, the HL-LHC will be blind to neutrinos and many proposed new particles. With the FPF, a diverse suite of experiments will detect millions of neutrinos at the highest energies ever seen from a human source and probe a wide range of new physics theories. The FPF will thereby expand our understanding of neutrino properties, probe proton and nuclear structure and the strong interactions in new regimes, clarify astroparticle data, and carry out world-leading searches for light dark matter, dark sectors, new forces, and many other new particles.

The **FPF** is supported by the CERN [Physics Beyond Collider \(PBC\)](#) group.






Plan view - Cavern

WHERE WE ARE

- With the first direct detection of 153 collider neutrinos at FASER and 8 at SND@LHC in 2023, we have entered the era of **multi-messenger collider physics**: ν_e, ν_μ, ν_τ (soon), and new particles (possible).
- As with multi-messenger astronomy, we were once blind, but now we can see. This opens up a wealth of possibilities, and we already know of **entire classes of unique opportunities** to learn about neutrinos, QCD, and astroparticle physics, and new physics that **can be explored at the FPF and not elsewhere** (SHiP, SHADOWS, etc.).
- Report to PBC to be submitted June 2024 (TBC)
 - An update of facilities studies, including core study results, updates on vibration, RP studies, and revised estimate for CERN host lab costs.
 - A complete and unified plan for the size and placement of experiments in the cavern.
 - Completion of “flagship” physics studies that emphasize core strengths and also complementarity with the rest of the world-wide program.
 - If recommended, will then submit LOI to LHCC in early 2025.

FPF7 THURSDAY

- All sessions are hybrid
 - not recorded, use microphones so online people can hear questions
- Morning
 - CERN Welcome
 - Physics Opportunities
 - Civil Engineering, Integration
 - Status of the Experiments
- Afternoon
 - “SM” Parallel Session
 - BSM Parallel Session
- Evening
 - Workshop Dinner

Introduction 222/R-001, CERN	Jonathan Lee Feng 09:00 - 09:10
CERN Welcome 222/R-001, CERN	Mike Lamont 09:10 - 09:20
FPF Physics Opportunities 222/R-001, CERN	Prof. Subir Sarkar  09:20 - 09:45
FPF Civil Engineering 222/R-001, CERN	Tamara Alice Bud  09:50 - 10:05
FPF Integration 222/R-001, CERN	Anastasiya Magazinik 10:10 - 10:25
FASER2 222/R-001, CERN	Olivier Salin  10:30 - 10:55
Coffee 222/R-001, CERN	11:00 - 11:30
FASERnu2 222/R-001, CERN	Dr Akitaka Ariga 11:30 - 11:55
Advanced SND 222/R-001, CERN	Giovanni De Lellis 12:00 - 12:25
FORMOSA 222/R-001, CERN	Juan Salvador Tafoya Vargas 12:30 - 12:55
FLaRe 222/R-001, CERN	Steven Linden 13:00 - 13:25
Neutrino Rate Predictions for FASER and the FPF Max Fieg 222/R-001, CERN	15:00 - 15:15
Event generators for high energy electron and neutrino DIS 222/R-001, CERN	15:20 - 15:35
Resolving the HL-LHC beam bunch structure with timing ... Matteo Vicenzi	
Neutrino tridents at the LHC 222/R-001, CERN	Dr Toni Makela 16:00 - 16:15
Coffee 222/R-001, CERN	16:20 - 16:50
Neutrino flux constraints with the low-nu method Callum David Wilkinson	
LHCb potential to discover long-lived new physics particl... Maksym Ovchynnikov	
Phenomenology of axion-like particles with universal fer... Maksym Ovchynnikov	
Probing Lepton-Flavor-Violating ALPs with Muons at the ... Roman Marcarelli	
Discovering Heavy Neutral Leptons with the Higgs Boson Nicolás Bernal	
FORESEE: Updates and Expanded Model Library Roshan Mammen Abraham	
BSM Physics Opportunities with Far-Forward Experi... Jyotsmita Adhikary	
Coffee 13/2-005, CERN	16:20 - 16:50
Dark showers from the Z portal 13/2-005, CERN	LINGFENG LI 16:50 - 17:05
New Physics through neutrons at FASER Aparajitha Karthikeyan	
Light scalars from B- and D-meson decays at FASER: mo... Reuven Balkin	

FPF7 FRIDAY

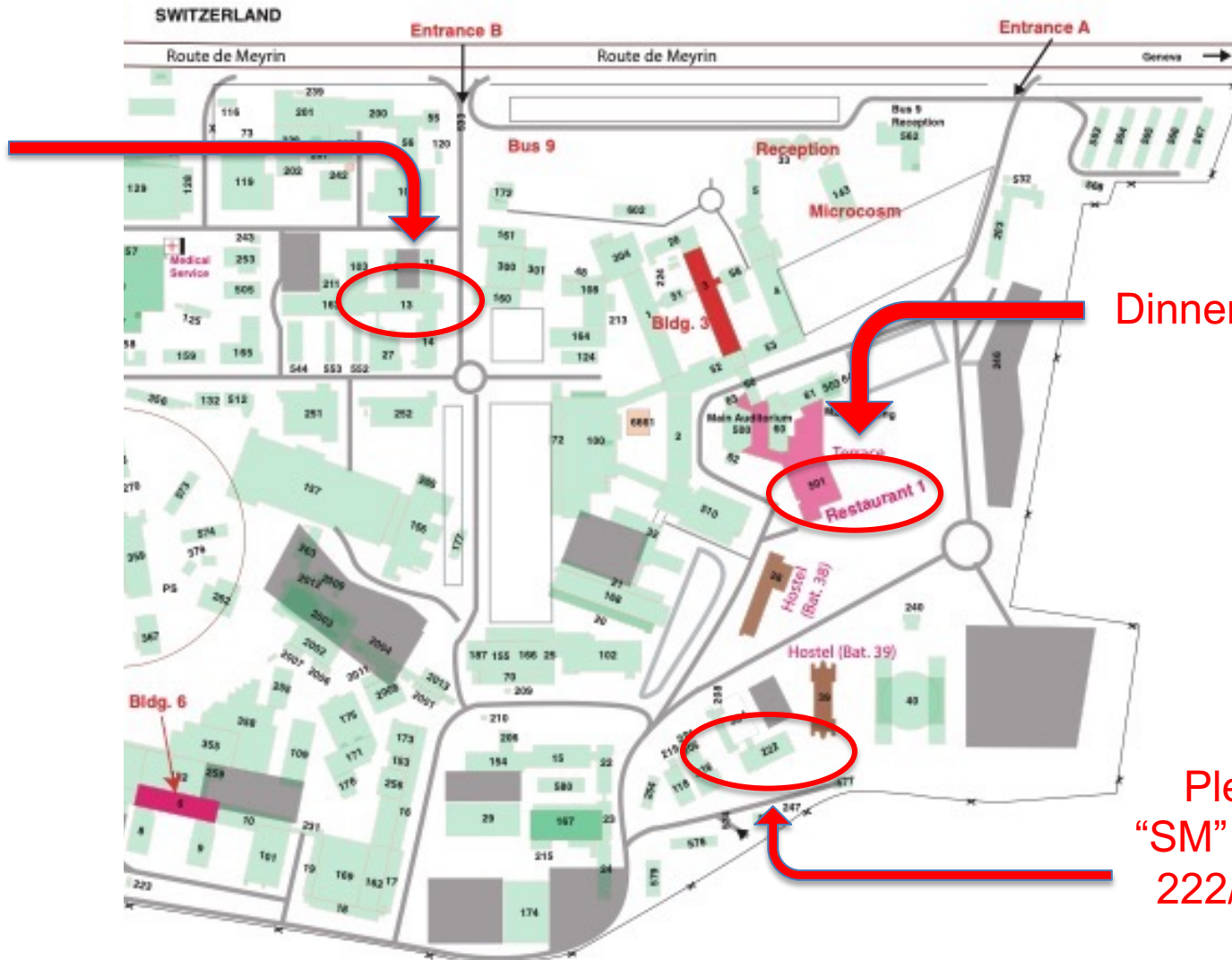
- Morning
 - Reports from Regions (US, UK, Japan, and others)
 - PBC Report Discussion
 - Options
 - Magnet
 - New Detectors
- Afternoon
 - Astroparticle Connections
 - FPF@FCC
 - General Discussion

US DOE/NSF Support Letter 222/R-001, CERN	Jonathan Lee Feng et al. 09:00 - 09:10
Reports from UK, Japan, and other regions regarding organization, funding 222/R-001, CERN	Dr Akitaka Ariga et al. 09:10 - 09:40
PBC Report Discussion 222/R-001, CERN	Jonathan Lee Feng 09:50 - 10:50
Coffee 222/R-001, CERN	11:00 - 11:30
FASER2 Magnet 222/R-001, CERN	Hidetoshi Otono 11:30 - 11:50
NuTeV-like detector 222/R-001, CERN	Lydia Brenner et al. 12:00 - 12:20
Nu_e Detector 222/R-001, CERN	Josh McFayden 12:30 - 12:50
Open questions in atmospheric lepton fluxes 222/R-001, CERN	Anatoli Fedynitch et al. 15:00 - 15:20
Forward Charm with IceCube Neutrinos from TeV to PeV 222/R-001, CERN	Lu Lu et al. 15:30 - 15:50
Hadronic Interactions and the Pierre Auger Observatory 222/R-001, CERN	Ralph Engel et al. 16:00 - 16:20
FPF@FCC 222/R-001, CERN	Dr Juan Rojo et al. 16:30 - 16:50
Discussion 222/R-001, CERN	17:00 - 17:45
Workshop Summary 222/R-001, CERN	17:45 - 18:00

FPF7 MEETING ROOMS

- Thanks to local organizers Jamie Boyd and Albert De Roeck.

BSM
Parallel
13/2-005



Dinner 7pm

Plenary
"SM" parallel
222/R-001