



# Summary and status of HL-LHC Collaborations

B. Di Girolamo



12<sup>th</sup> HL-LHC Collaboration Meeting – Uppsala – 19-22 September 2022

**12<sup>th</sup> HL-LHC Collaboration Meeting**  
**UPPSALA - Sweden**  
**19 - 22 September 2022**

The 12<sup>th</sup> HL-LHC Collaboration Meeting will take place in Uppsala, Sweden, from 19<sup>th</sup> to 22<sup>nd</sup> September 2022, as an in-person meeting.

Based on the traditional programme with plenary and work package parallel sessions, this meeting will serve as a technical update forum for the GP Cost and Schedule Review, planned at IC20 in November 2022, and provides the framework for additional collaborative meetings between the project partners.

This year, the main objectives will be to update all HiLumi collaborators on the results of Key HL-LHC prototype tests, to highlight the progress made in the transition from prototype validation to series production, and to update all collaborators on the latest schedule changes.

**CERN - Organising Committee**  
 Oliver Böling Project Leader  
 Markus Dillies Deputy Project Leader  
 Guido Hahn Project Office

**Uppsala - Organising Committee**  
 Ulf Lundberg Chairman  
 Richard Bower Head of Physics Department  
 Head of HEP Department  
 Head of HEP Department  
 Hans Sandberg Kern Technical Leader (DHF project)

**For more details and registration**  
[www.hllhc.meet.ub.se](http://www.hllhc.meet.ub.se)

# Collaborations summary

- Most of the collaboration agreements have been signed and are in full execution
- Signed since last Annual Meeting
  - The Framework agreement and 3 out of 5 addenda for the CERN-UK Phase 2
  - The DFHX/M agreement CERN-Uppsala
- Pending
  - Addenda 1 and 3 of CERN-UK Phase 2: finalized just time to get all signatures collected
  - INFN and CIEMAT amendments: last details fixed, signatures to be collected
- Agreements that did not materialize
  - The CERN-Serbia agreement for Jaks/Supports: contribution delivered as cash
  - The ten CERN-Russia agreements: funding did not arrive, schedule started to be pressing therefore a mitigation plan needed to be put in place

# Items previously foreseen as Russian contribution

<b>signed not yet funded</b>	Russia	BINP	TAXS and TAXN
	Russia	BINP	Current leads matching section and inner triplets
	Russia	BINP	Low impedance collimators (12 units) + IR collimators (28 units)
	Russia	BINP	Solid State RF powering (replacing IOT)
	Russia	BINP	BPM Mechnics (20+28 units)
	Russia	Protvino	Ionisation chambers for SPS and LHC systems for HL-LHC beams (1000 units)
	Russia	MEPhI	HF-HOM and HOM Couplers and Filed Antennas
	Russia	BINP	LHC Kickers and Dump
	Russia	BINP	Hollow e-lens
	Russia	PNPI/Protvino	Crystal collimation for ions

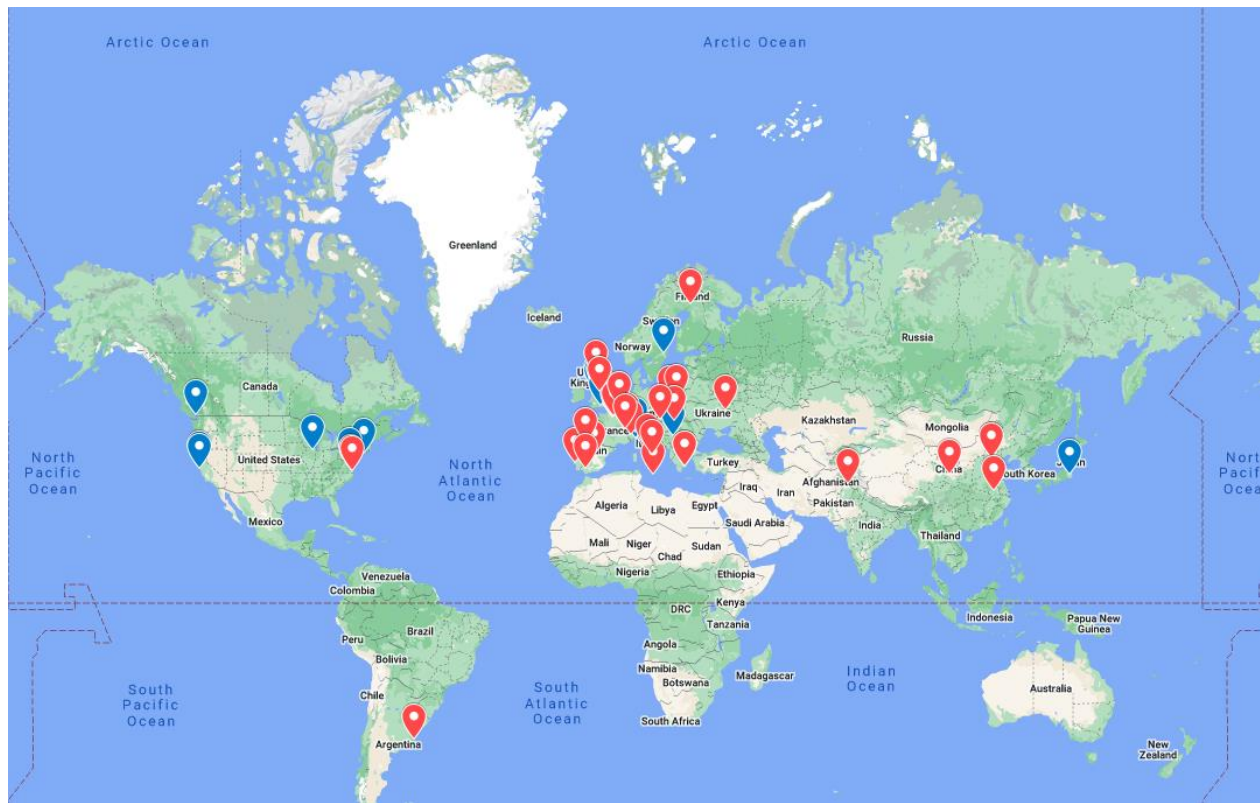
**They have been subject to detailed internalisation actions or had to be descoped from the project**

# Strategy and ongoing discussions

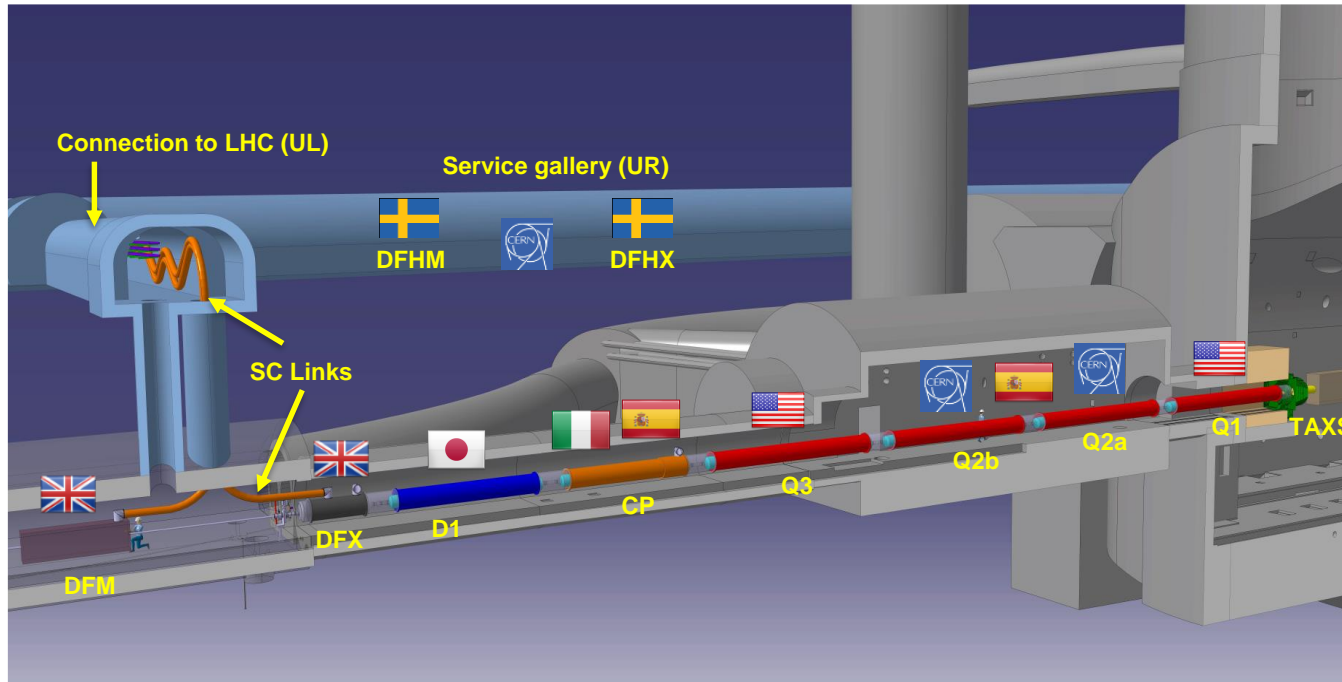
- Actions for internalisation and/or industrial procurement have started for most items in-line with master schedule
- Some options explored in parallel for a few items:
  - Discussions have been taking place with KEK-Japan to have a contribution on:
    - Quench Heater Power Supplies, waiting for possible funding next year
    - Other items that would possibly be funded in 2024; analysis of (schedule) impact ongoing (while launching standard procurement process at CERN in compliance with master schedule)
  - Discussion have been taking place with CPNEM-Brazil for possible contributions on several items:
    - No commitments yet
    - Technical discussions ongoing

Country	Institution	Signed
Canada	TRIUMF	MoU
	IHEP Beijing	MoU, Add
China	BJUT	MoU
	ASIPP	MoU
Finland	LAPIN	CA, MoU
	CNRS	MoU
France	CEA	CA
	NTUA	MoU
Greece	IASA	MoU
	INFN	CA, MoU
Japan	KEK	MoU, Add
JINR	JINR Dubna	CA, MoU, Add
Malta	University of Malta	CA, MoU
Pakistan	Pakistan Atomic En. Comm.	CA
	AGH-UST	CA
Poland	NCBJ	CA, MoU
	IFJ-PAN	CA, MoU
	BINP	CA, MoU
Russia	IHEP Protvino	CA
	PNPI	CA
	MEPhI	MoU, CA
	Faculty of Physics	CA
Spain	CIEMAT	CA, MoU, Add
	University of Basque Country	CA, MoU, Add
Sweden	University of Uppsala	CA, MoU, Add
Switzerland	EPFL	CA, MoU
	University of Geneva	CA, Add
UK	University of Manchester	CA, MoU
	University of Lancaster	CA, MoU
	Royal Holloway University	CA, MoU
	University of Liverpool	CA, MoU
	STFC	CA
	University of Southampton	CA, MoU
	University of Dundee	CA, MoU
	University of Huddersfield	CA, MoU
	University of Oxford	MoU
Ukraine	Kharkov Institute of Physics	MoU, Add
USA	SLAC	CA
	FNAL	CA
	LBNL	CA
	BNL	CA
	JLAB	CA
	ODU	CA

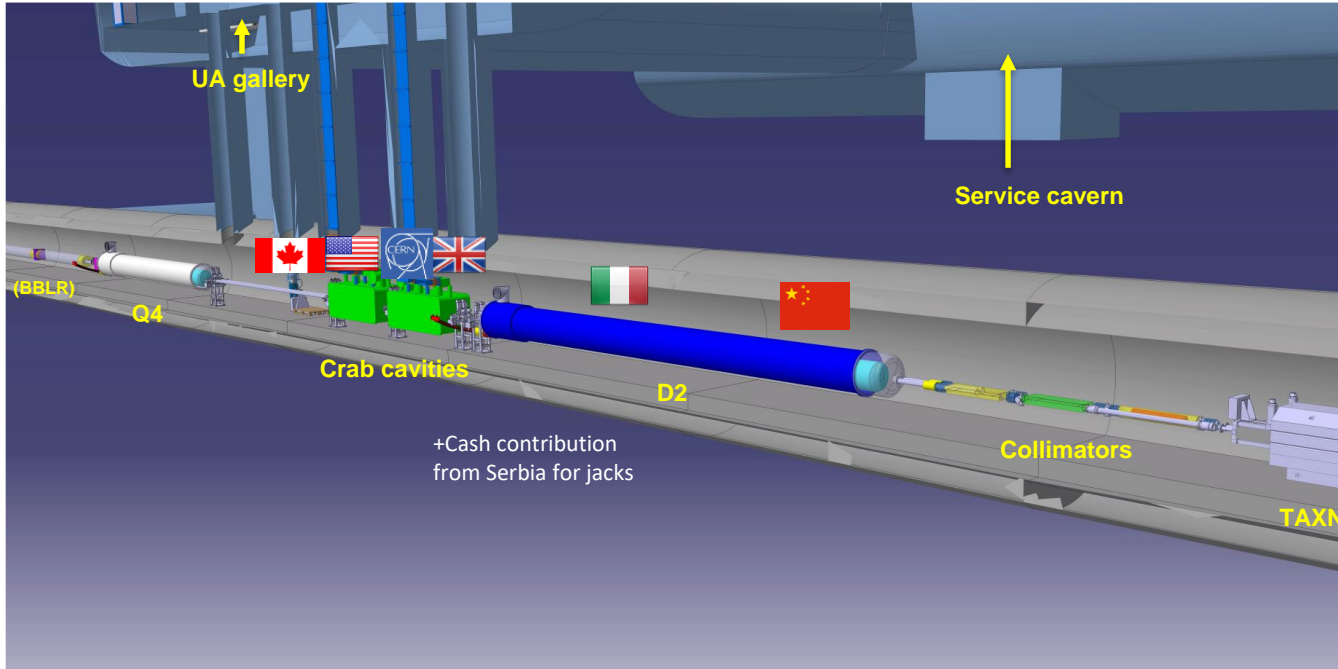
## Collaborating Institutes to date



# The Inner Triplet region: collaborations



# The MS (matching section) region: collaborations



# Meetings

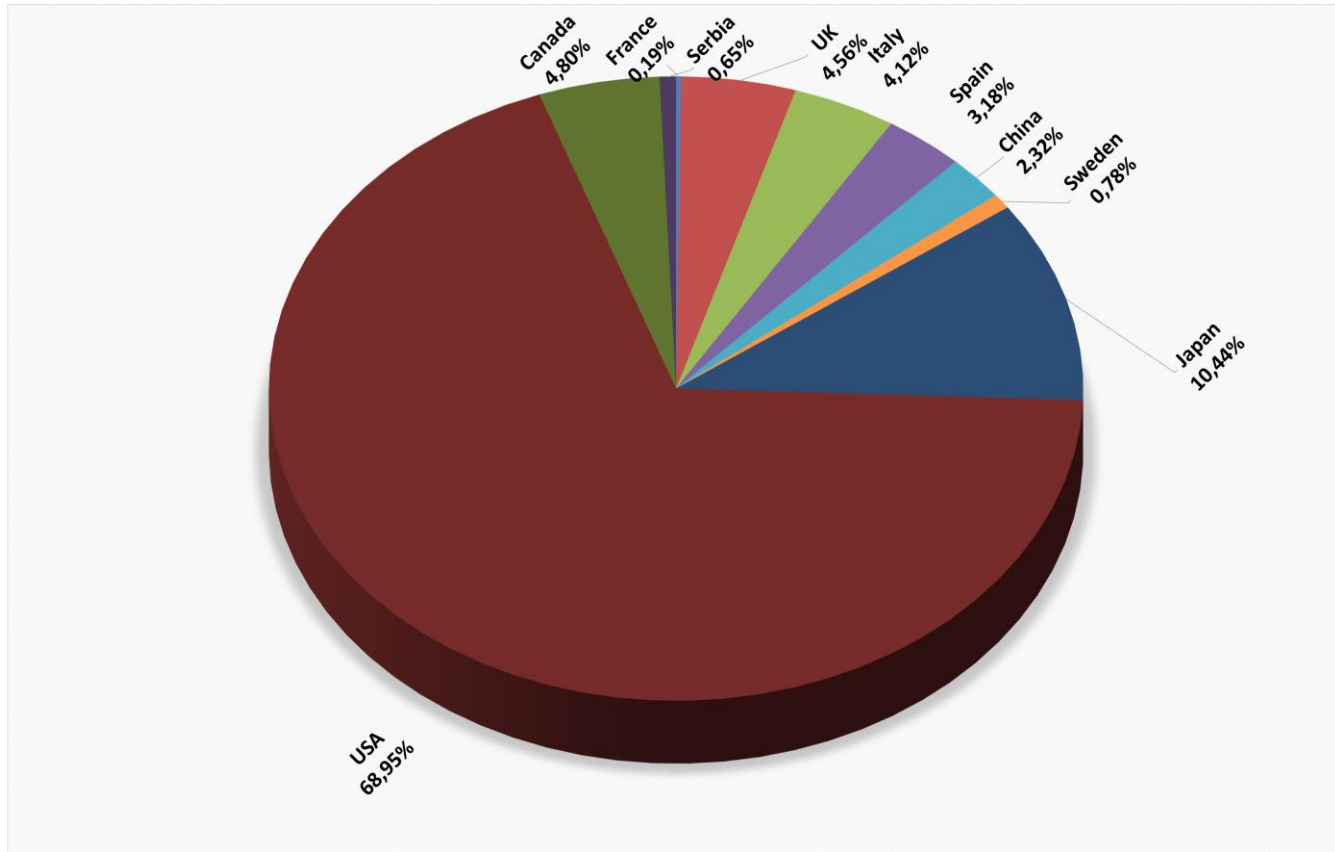
- Since the last Annual meeting
  - 9 Steering Meetings
  - 8 topical/technical meetings
- These are meetings involving the CERN and Project management or organized by the collaboration office
- Of course, many more meetings are happening within the work-packages



# Summary: TOTAL in-kind ~ 9.5% of Project CORE cost

	COUNTRY	Agreement	Institute	Brief description of the collaboration
R&D	France	KE2736	CEA	Thermal Design of Superconducting High Field Magnets at CERN
	UK	KE3298	Manchester	Beam instrumentation
	UK	KE3299	Manchester	Cold powering: DFBX for String
	UK	KN3362	ASTeC+Dundee	Laser treatment prototype (LESS)
Prototypes and BASELINE	Italy	KE3085+KE2291	INFN	High-order corrector magnets + prototypes
	Spain	KE2292+3797	CIEMAT	Nested orbit correctors + prototypes
	China	KN4154	IHEP	D2 Correctors
	Sweden	KE3082	Uppsala Univ.	Cold testing of corrector magnets and crab cavities
	Japan	ICA-JP-010+KN4074	KEK	D1 magnet model and cold mass
	Italy	KE2291+KE3084+KE4417	INFN	D2 model + prototype+ Magnet
	USA	P131	Several	Crab Cavities
	USA	P131	Several	Triplet magnets
	Canada	P095	TRIUMF	RFD Crab-cavities cryomodules
	Sweden	KE5162	Uppsala Univ.	Parts for the DFHM and DFHX 8+1 units
	UK	KE5170	SOTO	DFM and DFX 8+1 units
	UK	KE5168	ASTeC+Lancaster	DQW Crab-cavities cryomodules
	UK	KE5169	LIV+RHUL	Beam instrumentation EO-BPM
	UK	KE5169	Liverpool	Beam Instr. for Hollow e-lens
	UK	KR5171	Dundee	Laser treatment (LESS)
Serbia	-	Ministry	Cash contribution to jcks construction	

# Contributions share



# Conclusions

- The Collaborations play an important role for the HL-LHC project
- (Series) Production started for most of the collaborations
  - Status of the various collaborations will be visible in the talks this week
- Few important addenda remain to be fully signed
- Some amendments for schedule adaptations being signed, more expected
- Ongoing discussions for possible additional in-kind contributions
- The collaboration office is available to provide support across WPs