



# Summary and status of HL-LHC Collaborations

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on behalf of the HiLumi collaborations office

13<sup>th</sup> HL-LHC Collaboration Meeting – TRIUMF – 25->28 September 2023

## Collaborations summary

- Most of the collaboration agreements are signed and are in full execution
- Since last Annual Meeting
  - CERN-UK Phase 1 (one signature missing on KE3297 and two invoices)
  - CERN-UK Phase 2 – all signed – no invoices yet
  - KEK – transfer of ownership for D1 magnets
  - INFN – expert support (pending INFN signature)
- Agreements that did not materialize
  - CERN-Russia agreements: termination letters TBD for two remaining agreements (Hollow Electron Lens and beam dump)

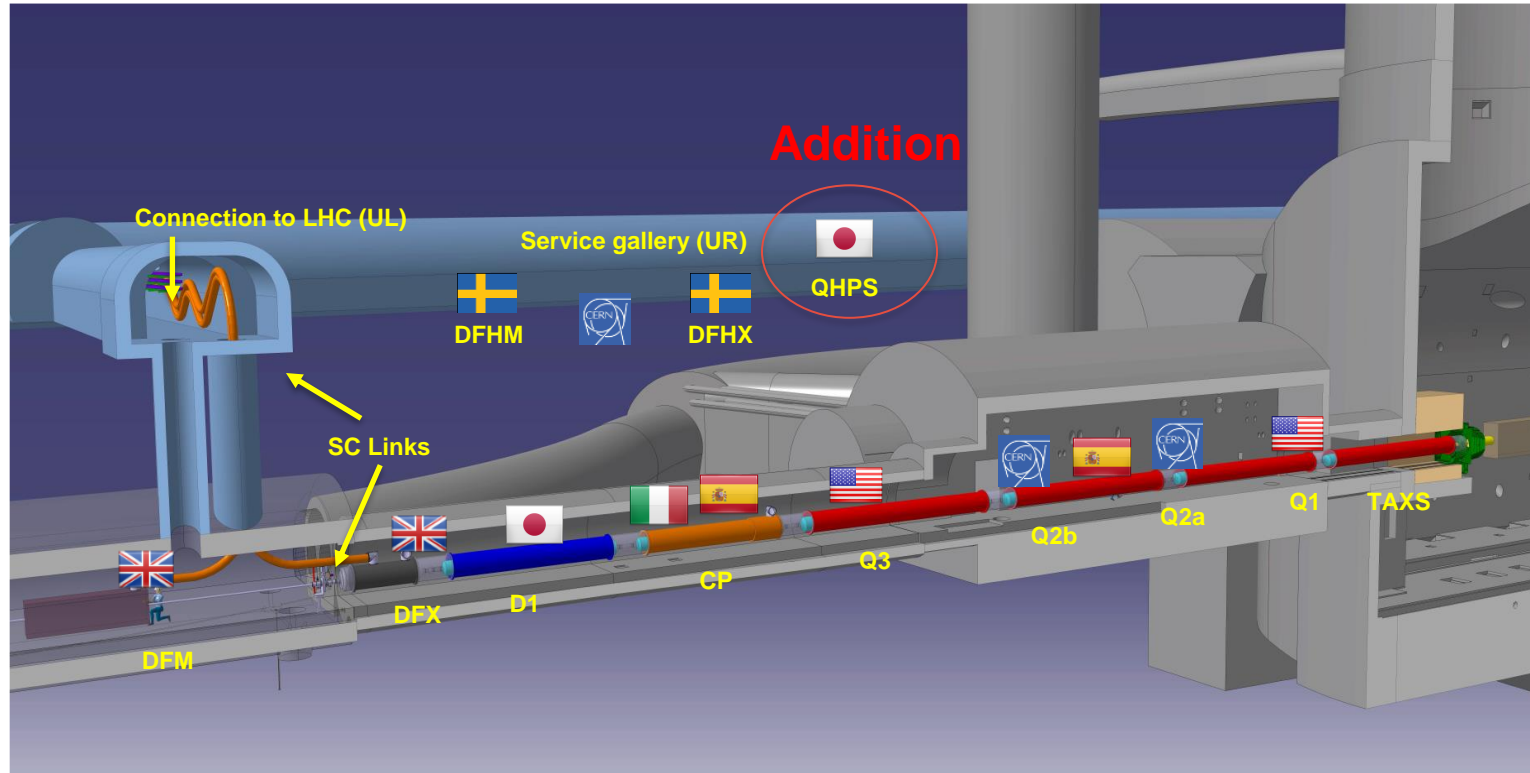
# Items previously foreseen as Russian contribution

|                              | What  | Project action   |
|------------------------------|---|--|
| <b>signed not yet funded</b> | TAXS and TAXN   | Industrial procurement   |
|                              | Current leads matching section and inner triplets                         | In-house production at CERN with large part of materials purchased via industrial procurement        |
|                              | Low impedance collimators (12 units) + IR collimators (28 units)          | Industrial procurement   |
|                              | RF power amplifiers for crab cavities                                     | Promising news from KEK  |
|                              | BPM Mechanics (20+28 units)   | Industrial procurement   |
|                              | Ionisation chambers for SPS and LHC systems for HL-LHC beams (1000 units) | Prototype in-house, Industrial procurement for series. Actively looking for potential collaborations |
|                              | HF-HOM and HOM Couplers and Filed Antennas                                | In-house production at CERN  |
|                              | LHC Kickers and Dump  | Kickers: descoped<br>Dump: In-house production at CERN   |
|                              | Hollow e-lens   | Descoped (soft landing)  |
|                              | Crystal collimation for ions  | In-house production at CERN  |

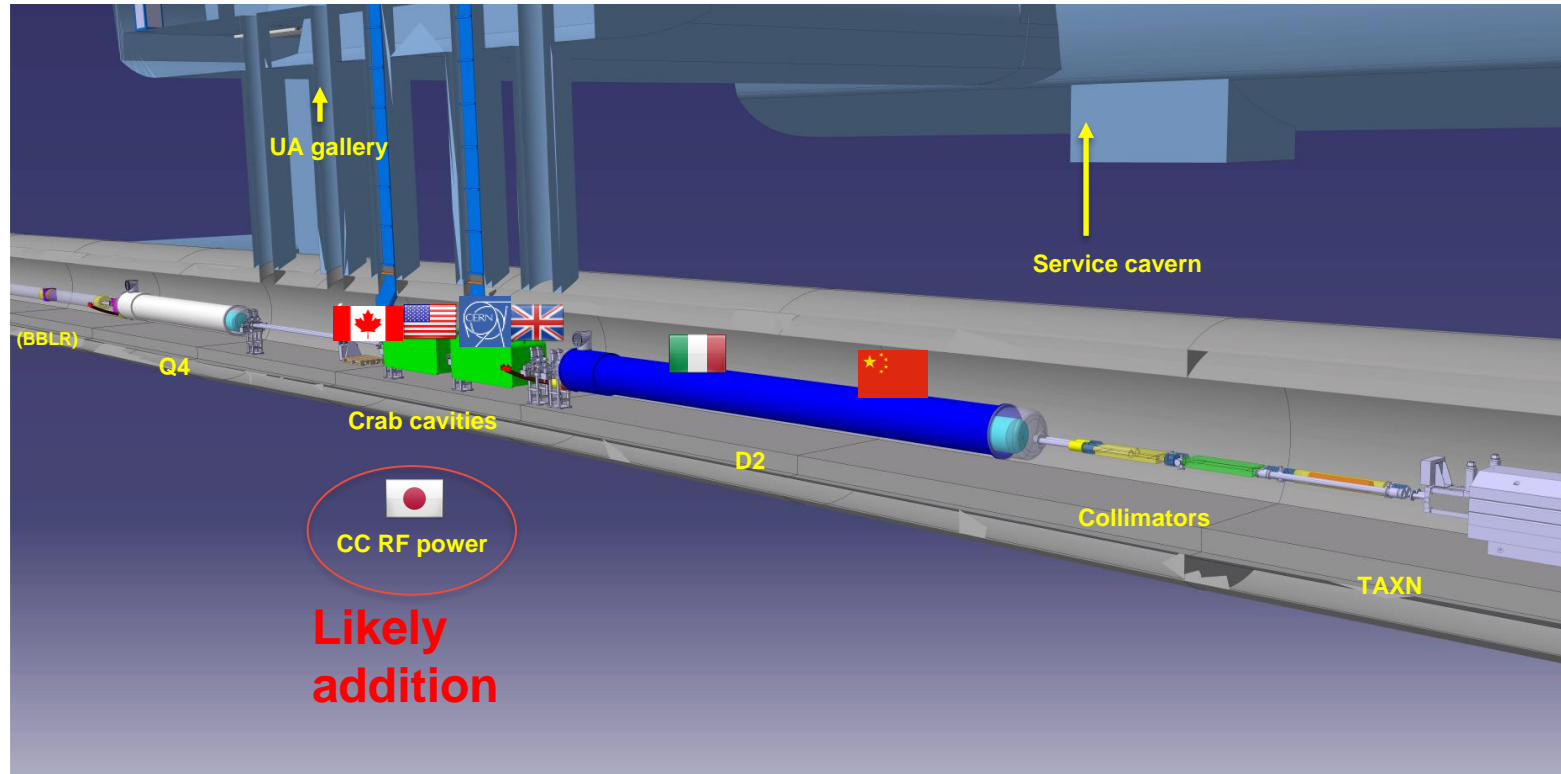
# Strategy

- Procurement being prepared (**see Hector's presentation**)
- Options explored in parallel for a few items:
  - Discussions took place with KEK/Japan to contribute on:
    - Quench Heater Power Supplies
      - Commitment letter duly received and archived
      - Agreement under preparation awaiting updates from KEK
      - CERN visit to Japan planned for mid-Oct 2023
    - RF power amplifiers and distribution for crab cavities
      - Awaiting news from KEK
- Discussions took place with CPNEM-Brazil for possible contributions on some items:
  - Negative outcome due to CERN associate membership status not yet granted
- Discussions with the Pakistani ILO (manufacturing and assembly)

# The Inner Triplet region: collaborations



# The MS (matching section) region: collaborations



# Meetings

- Since the 2022 annual meeting
  - 7 collaboration steering meetings (INFN, IHEP, KEK, AUP, UNIMAN, CIEMAT, Uppsala)
  - First TRIUMF steering meeting right after this meeting (with AUP participation)
- Future SC meetings:
  - IHEP and AUP steering meetings planned during December 2023
  - CIEMAT SC January 2024
  - INFN SC February 2024
  - KEK SC March 2024 (D1, QHPS, CC RF power)
  - UNIMAN SC April 2024
  - Uppsala SC June 2024
- Many other technical meetings within the work-packages

# Summary: TOTAL in-kind ~94 MCHF (Sep 2023)

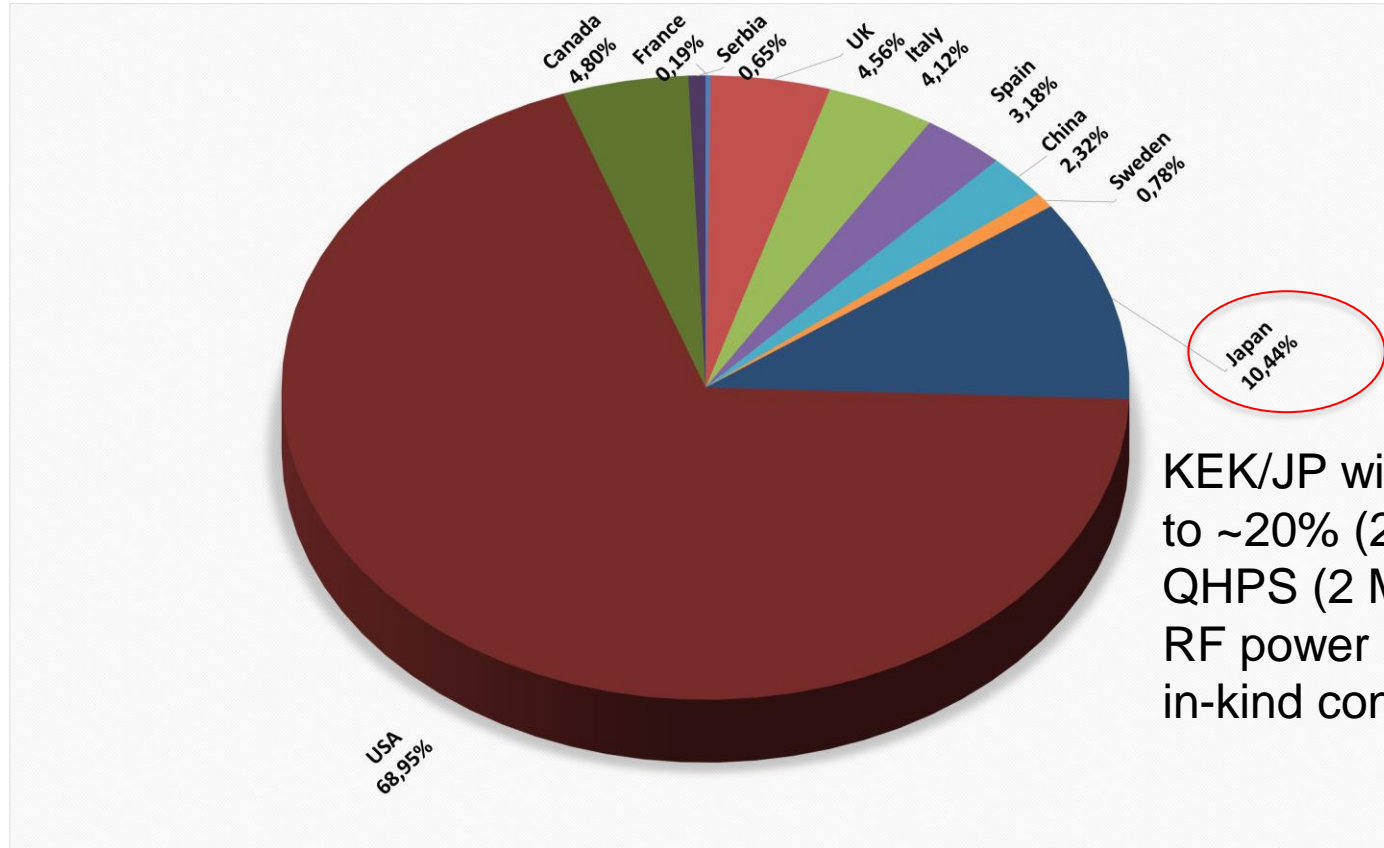
|                                | COUNTRY | Agreement            | Institute       | Brief description of the collaboration                       | in-kind-value |
|--------------------------------|---------|----------------------|-----------------|--|---------------|
| <b>R&amp;D</b>                 | France  | KE2736               | CEA             | Thermal Design of Superconducting High Field Magnets at CERN | 118           |
|                                | UK      | KE3298               | Manchester      | Beam instrumentation   | 317           |
|                                | UK      | KE3299               | Manchester      | Cold powering: DFBX for String                               | 26            |
|                                | UK      | KN3362               | ASTeC+Dundee    | Laser treatment prototype (LESS)                             | 0             |
| <b>Prototypes and BASELINE</b> | Italy   | KE3085+KE2291        | INFN            | High-order corrector magnets + prototypes                    | 1045          |
|                                | Spain   | KE2292+3797          | CIEMAT          | Nested orbit correctors + prototypes                         | 3040          |
|                                | China   | KN4154               | IHEP            | D2 Correctors  | 2225          |
|                                | Sweden  | KE3082               | Uppsala Univ.   | Cold testing of corrector magnets and crab cavities          | 0             |
|                                | Japan   | ICA-JP-010+KN4074    | KEK             | D1 magnet model and cold mass                                | 9000          |
|                                | Italy   | KE2291+KE3084+KE4417 | INFN            | D2 model + prototype+ Magnet                                 | 2900          |
|                                | USA     | P131                 | Several         | Crab Cavities  | 6065          |
|                                | USA     | P131                 | Several         | Triplet magnets  | 59950         |
|                                | Canada  | P095                 | TRIUMF          | RFD Crab-cavities cryomodules                                | 4600          |
|                                | Sweden  | KE5162               | Uppsala Univ.   | Parts for the DFHM and DFHX 8+1 units                        | 750           |
|                                | UK      | KE5170               | SOTO            | DFM and DFX 8+1 units  | 1000          |
|                                | UK      | KE5168               | ASTeC+Lancaster | DQW Crab-cavities cryomodules                                | 1925          |
|                                | UK      | KE5169               | LIV+RHUL        | Beam instrumentation EO-BPM                                  | 200           |
|                                | UK      | KE5169               | Liverpool       | Beam Instr. for Hollow e-lens                                | 700           |
|                                | UK      | KR5171               | Dundee          | Laser treatment (LESS)                                       | 200           |

| Country      | in-kind value |
|--------------|---------------|
| France       | 118           |
| UK           | 4368          |
| Italy        | 3945          |
| Spain        | 3040          |
| China        | 2225          |
| Sweden       | 750           |
| Japan        | 9000          |
| USA          | 66015         |
| Canada       | 4600          |
| <b>Total</b> | <b>94061</b>  |

|                         |              |
|-------------------------|--------------|
| <b>Total of in-kind</b> | <b>94061</b> |
|-------------------------|--------------|



# In-kind contribution share (Sep 2023)



KEK/JP will increase to ~20% (2024) with QHPS (2 MCHF) and RF power (12 MCHF) in-kind contributions

# HLCB newsletter highlights

Please let us know about any highlights to be added



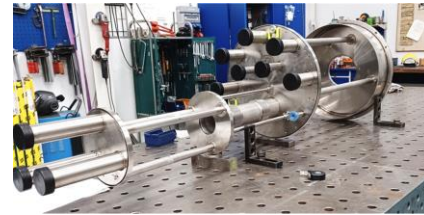
<https://hlcb-newsletter.web.cern.ch/>



HOM Corrector production celebration at LASA/Milan



Beam Gas Curtain(BGC) installation in the LHC



DFH blank assembly at RFR/SE



Assembly operation of the first Orbit Corrector prototype MCBXFA



Assembly of RFD crab cavity module



HL-LHC Collaboration Board members in Uppsala



D1 prototype magnet reception at CERN

# New CB SharePoint web-site

- <https://cern.sharepoint.com/sites/HL-LHC/CB/>
  - HL-CB members and minutes of HL-CB meetings
  - Collaboration institutes with links to MoU's, link-persons, SC meetings and agreements
  - Please check the pages and let us know if any changes should be made

The screenshot shows the SharePoint interface for the HL-LHC Project Management & Technical Coordination site. The breadcrumb trail includes: HL-LHC Project Intranet, HL-LHC Public Site, Indico Meetings, EDMS Structure, E-groups, ATS Sector, HL-LHC Industry Site, and Project Steering Meeting. The page title is "WP1 Project Management & Technical Coordination". The main content area is titled "Collaborations Office" and is published on 9/19/2023. It features a "Team" section with two members: Lars Jensen (LJ) and Cecile Noels (CN). A "Mandate" section describes the role of the Collaborations Officer, including preparing and amending collaboration agreements, documenting steering committee meetings, following up on deliverables, and preparing collaboration board meetings. A "Useful links" section includes links for "Planning of agreements (restricted)", "List of in-kind contributors", and "Collaboration Board subsite".

# Conclusions

- Collaborations play an important role for the HL-LHC project
- **Production started for all existing collaboration agreements**
  - Status of the various collaborations will be visible in the talks this week
  - Happy to document all good news in the HLCB newsletter
- Important addenda to be finalised and signed
- Amendments for schedule reasons (Covid'19 etc) being signed, more expected
  - Contracts involving money are typically very long to materialise
- **Collaboration office is available to provide support across WPs**