

FCC-ee MDI workshop no. 2

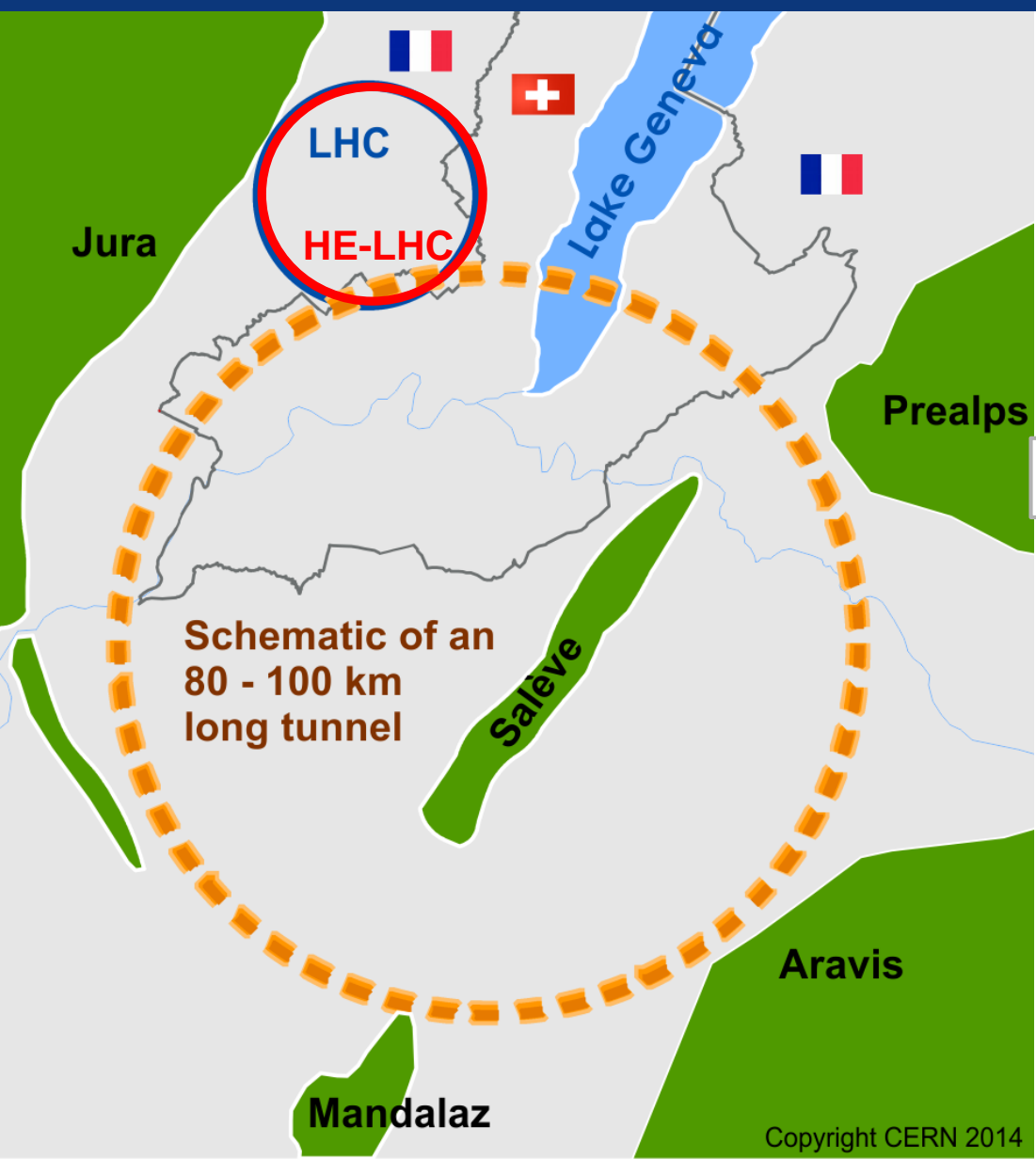
30 January – 9 February 2018

Welcome

Michael Benedikt and Frank Zimmermann



Future Circular Collider (FCC) Study

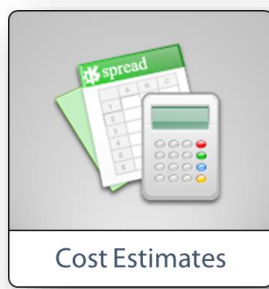
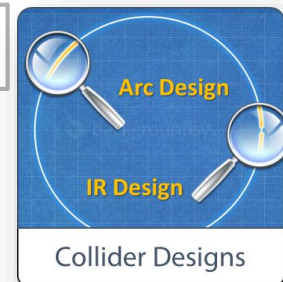
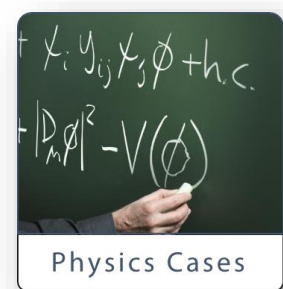


International FCC collaboration (CERN as host lab) to study:

- ***pp*-collider (FCC-*hh*)**
→ main emphasis, defining infrastructure requirements

~16 T ⇒ 100 TeV *pp* in 100 km

- ~100 km tunnel infrastructure in Geneva area, site specific
- ***e⁺e⁻* collider (FCC-*ee*)**, as potential first step
- **HE-LHC** with *FCC-hh* technology
- ***p-e* (FCC-*he*) option**, IP integration, *e⁻* from ERL





FCC study: physics and performance targets

FCC-ee:

- Exploration of 10 to 100 TeV energy scale via couplings with precision measurements
- ~20-50 fold improved precision on many EW quantities (equiv. to factor 5-7 in mass) (m_Z , m_W , m_{top} , $\sin^2 \theta_w^{\text{eff}}$, R_b , $\alpha_{\text{QED}}(m_Z)$, $\alpha_s(m_Z, m_W, m_\tau)$, Higgs and top quark couplings)
- Machine design for highest possible luminosities at Z, WW, ZH and $t\bar{t}$ working points

FCC-hh:

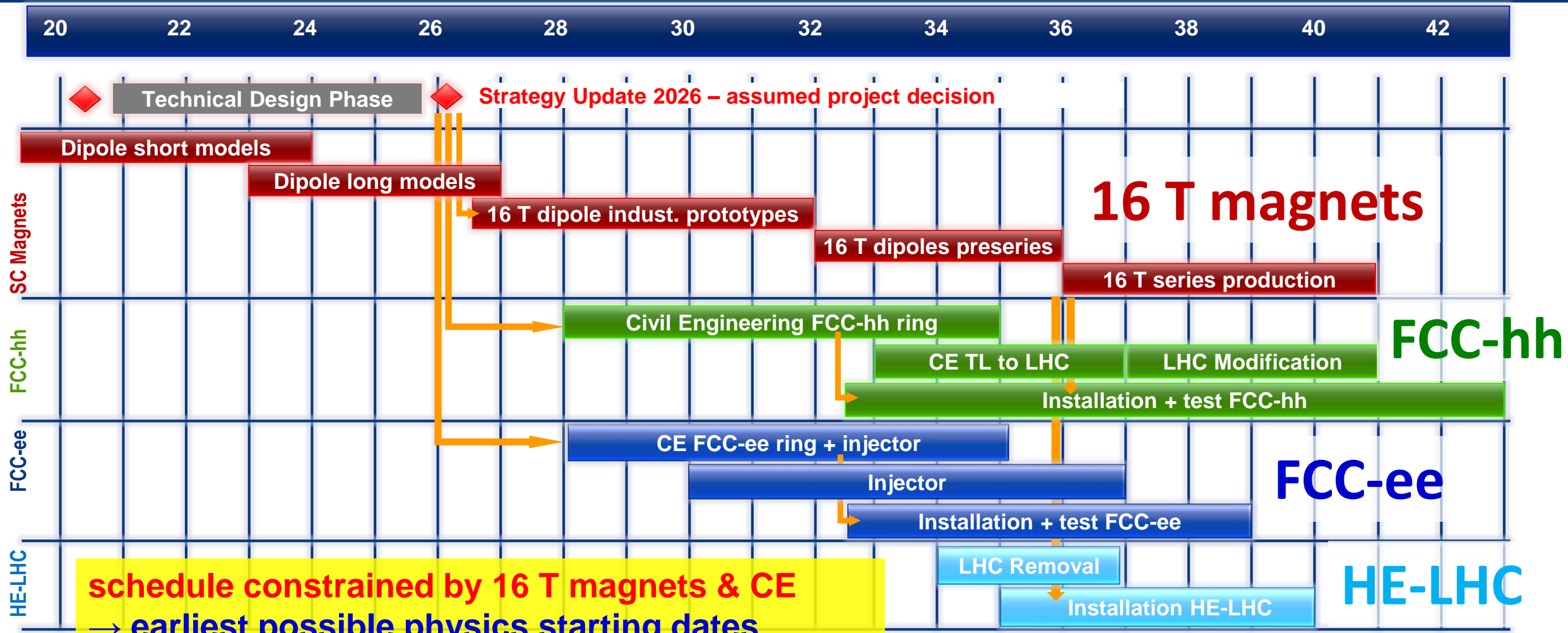
- Highest center of mass energy for direct production up to 20 - 30 TeV
- Huge production rates for single and multiple production of SM bosons (H,W,Z) and quarks
- Machine design for 100 TeV c.m. energy & integrated luminosity $\sim 20\text{ab}^{-1}$ within 25 years

HE-LHC:

- Doubling LHC collision energy with FCC-hh 16 T magnet technology
- c.m. energy = 27 TeV $\sim 14\text{ TeV} \times 16\text{ T}/8.33\text{T}$, target luminosity $\geq 4 \times \text{HL-LHC}$
- Machine design within constraints from LHC CE and based on HL-LHC and FCC technologies



Technical Schedule for each the 3 Options



schedule constrained by 16 T magnets & CE
→ earliest possible physics starting dates

- FCC-hh: 2043
- FCC-ee: 2039
- HE-LHC: 2040 (with HL-LHC stop LS5 / 2034)

FCC WEEK 2018

Future Circular Collider Conference
AMSTERDAM, Netherlands

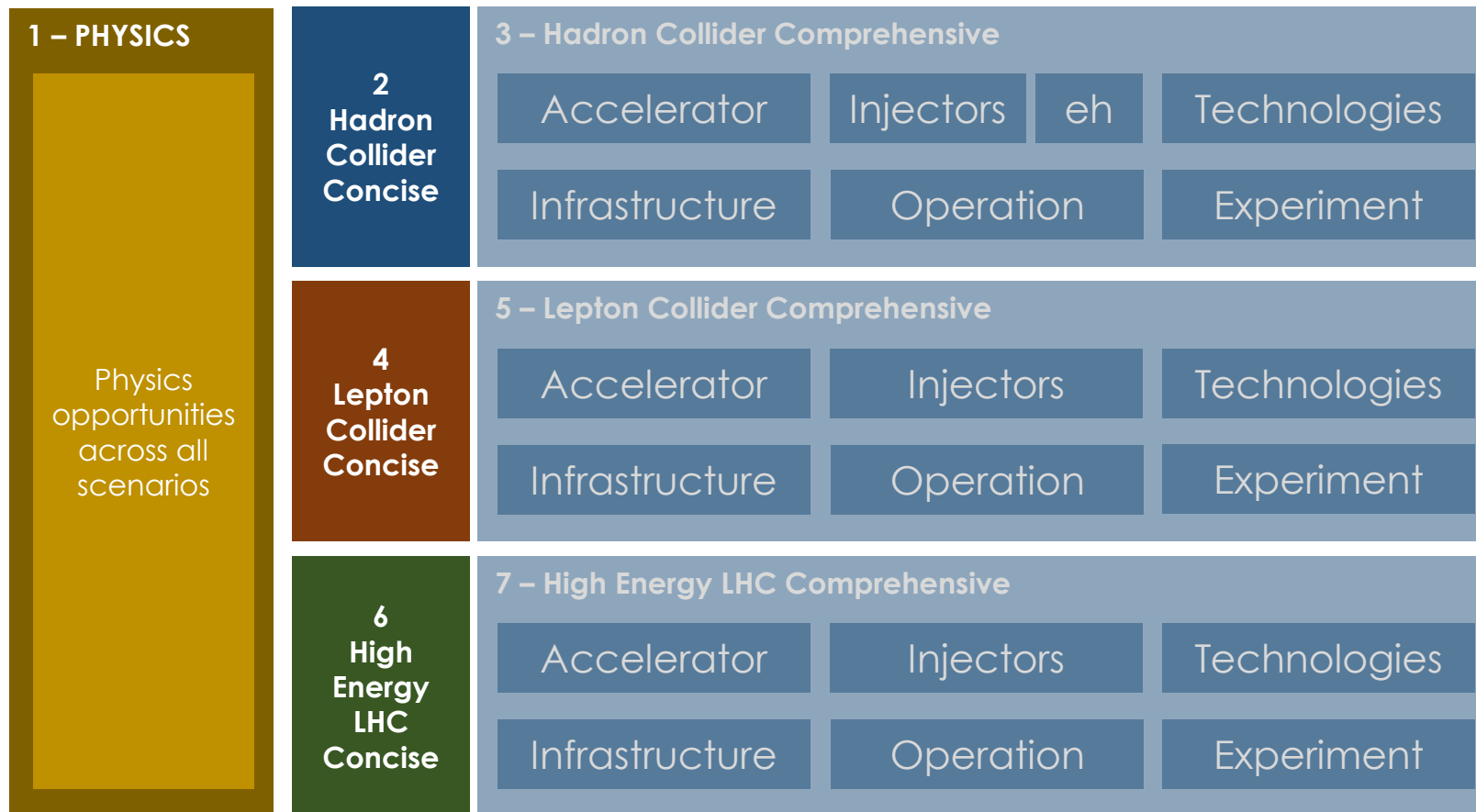


09 - 13 APRIL

fccw2018.web.cern.ch

also 2018
FCC Physics
Workshop,
15-19
January
2018, CERN

Structure – Coloured = In Work



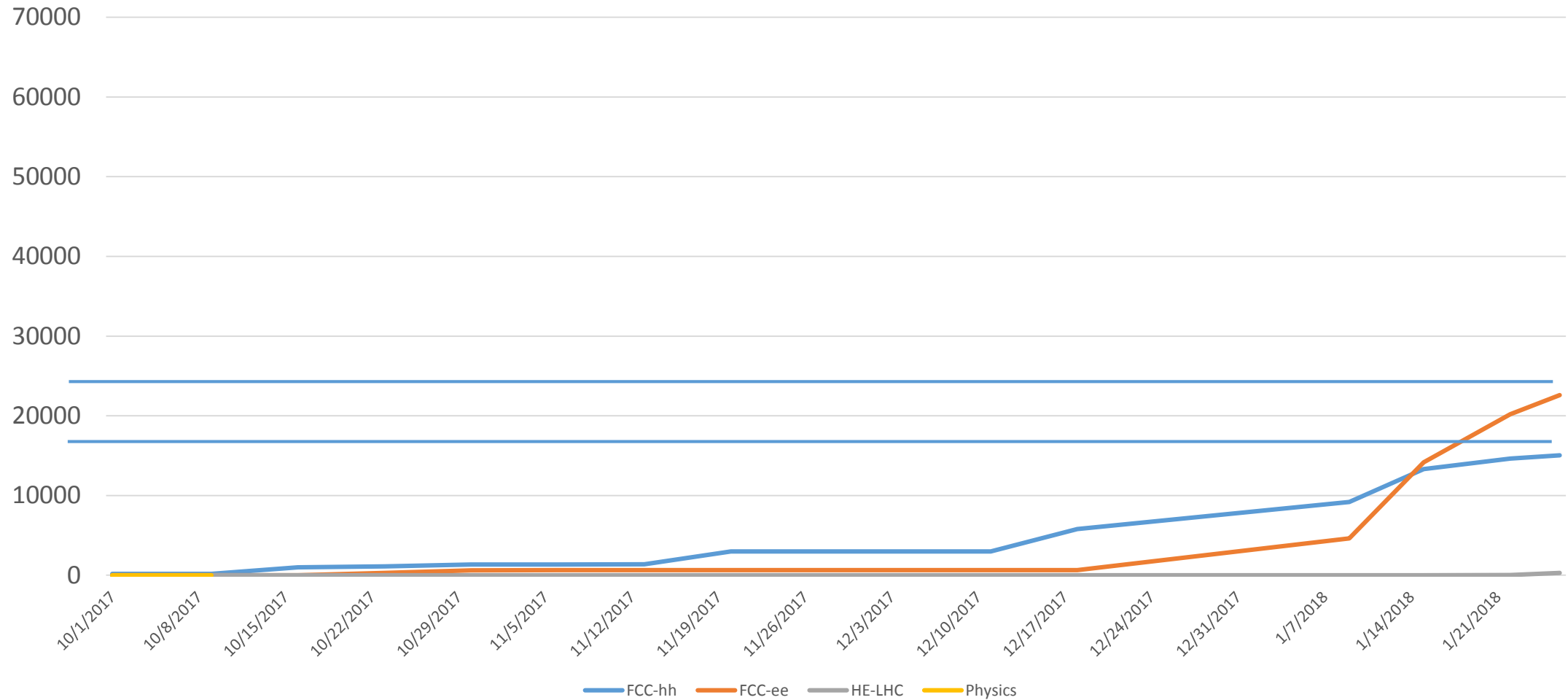
Status CDR

J. Gutleber

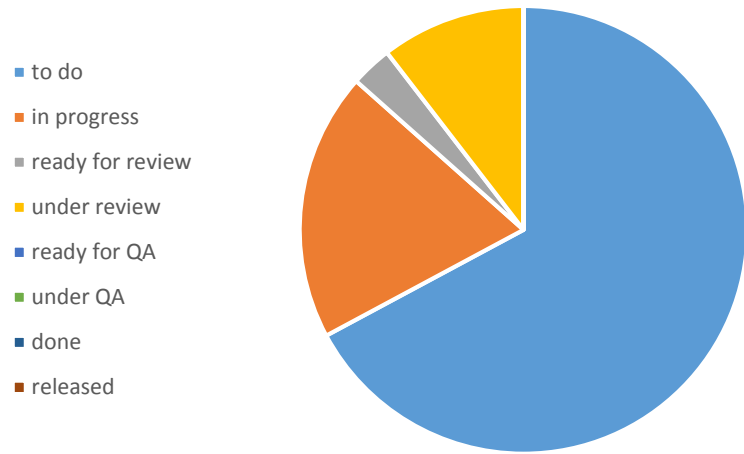
- Concise volumes hh, ee, HE in work
- Contract with John Poole for review & editing
 - Meet 1 per month in person at CERN
- Dedicated Website with documentation
 - Writing and editing infrastructure (LaTEX, GIT, Overleaf)
 - Formatting instructions (text, figures, tables, grammar rules)
 - Style guide
 - Dashboard with weekly status update and for controlled handover between authors, editors and editing consultant

Progress

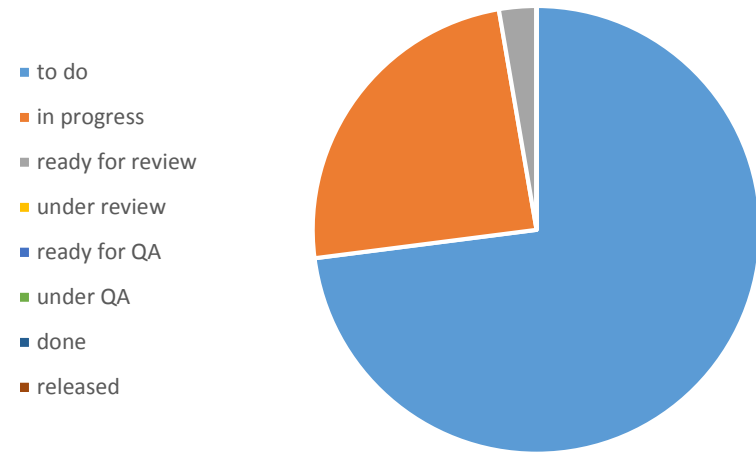
CDR Weekly Progress (Words per Volume)



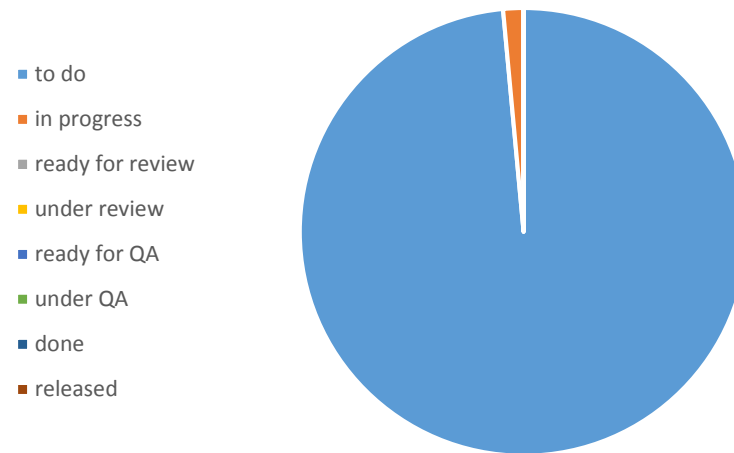
FCC-hh Progress (Sections)



FCC-ee Progress (Sections)












HE-LHC Progress (Sections)



CDR Timeline 2018

J. Gutleber

-  **January 31:** Draft contents of hh, ee, HE summary volumes ready
-  **February:** Editing
-  **March 1:** Distribution of summary volumes hh, ee, HE to International Advisory
-  **April 9-13:** Contents consolidation during FCC Week
-  **May 17/18:** Review by IAC
-  **July 30:** Deadline for any input for final version
-  **August/September:** Final editing, homogenization, references, glossary, index
-  **October:** Print of limited number of paper copies
-  **November 22/23:** Publication and presentation