Summary of Schedule and Status

F.Sakuma, RIKEN

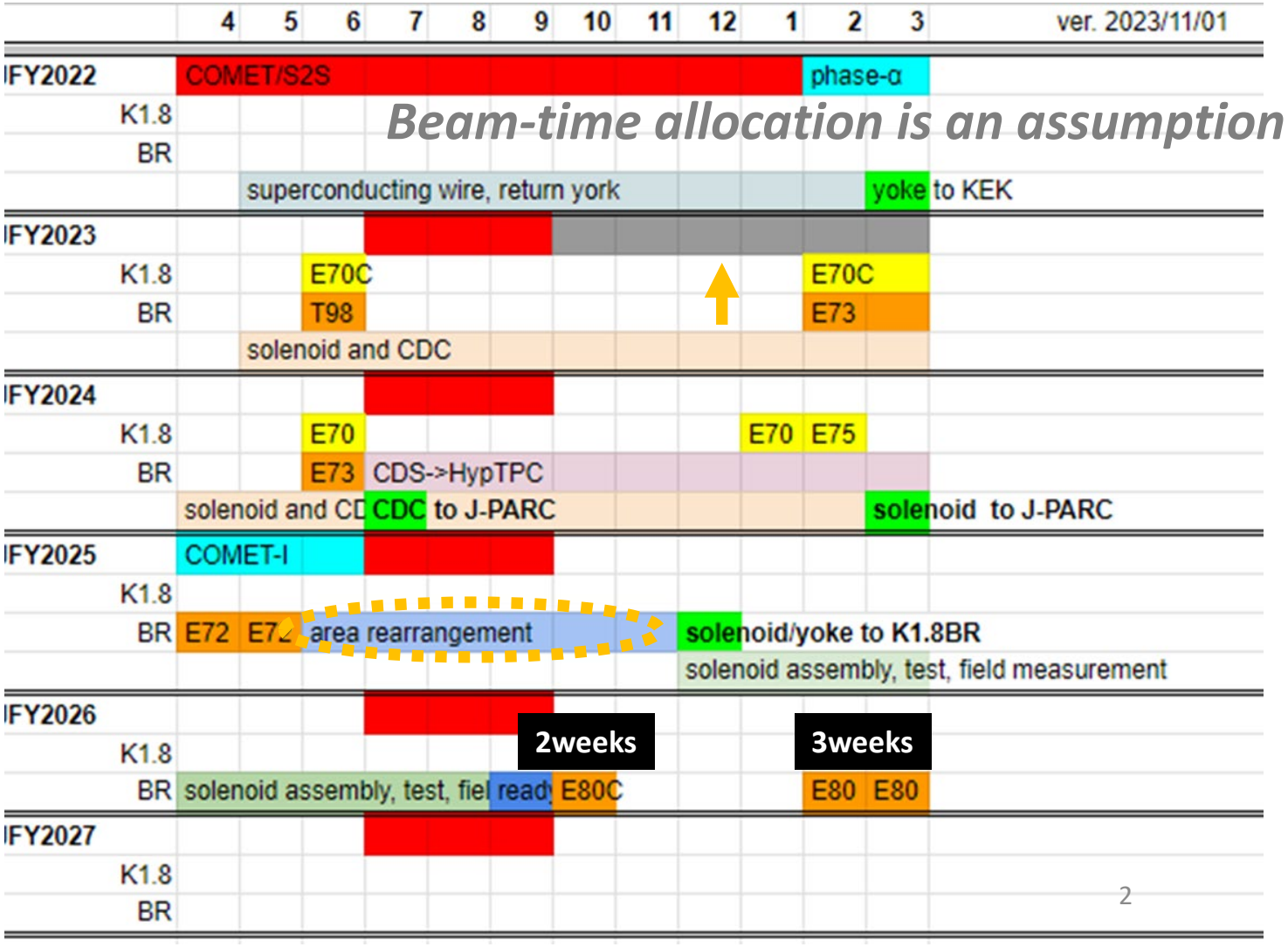
2023 12/14

(optimistic)

Earliest Schedule

- We will start E80 in FY2026
  - Detector construction ~ 3 years
    - Superconducting solenoid magnet
    - CDC (cylindrical drift chamber)
    - CNC (cylindrical neutron counter)
    - Target system modification
  - K1.8BR modification ~ 6 months
  - on-site assembly, test, and filed measurement of the magnet ~ 6 months
  - Installation of the CDS ~ 4 months

	FY2022				FY2023				FY2024				FY2025				2026~	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
SC Solenoid	Design		Purchase (SC Wire)		Construction							Installation & Test			Integration	Commissioning	Physics Run	Analysis & Pblication
NC	Design		Purchase (Scinti.)		Assembly				Test & Commissioning									
CDC	Design				Construction				Test & Commissioning									
K1.8BR Beam Line	E73(CDC) -> E72(HypTPC) Experiments										Upgrade		E80 Experiment					



Setup@K1.8BR

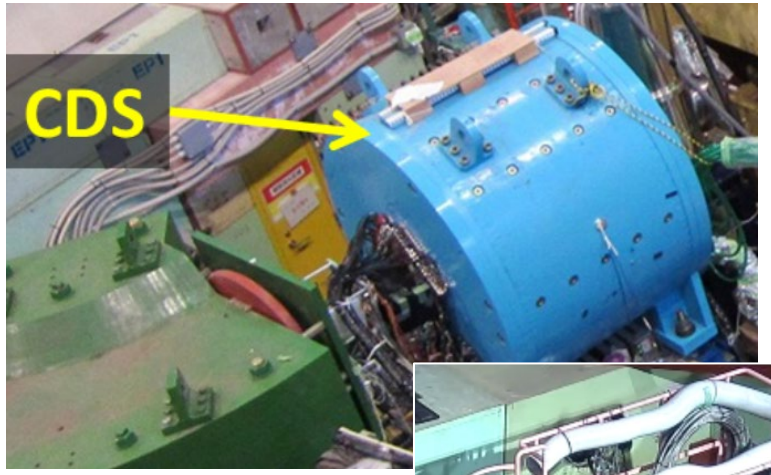
- **Present CDS** ~ before summer of FY2024
  - ✓E73 ($^{3}_{\Lambda}$H lifetime) 25d@80kW

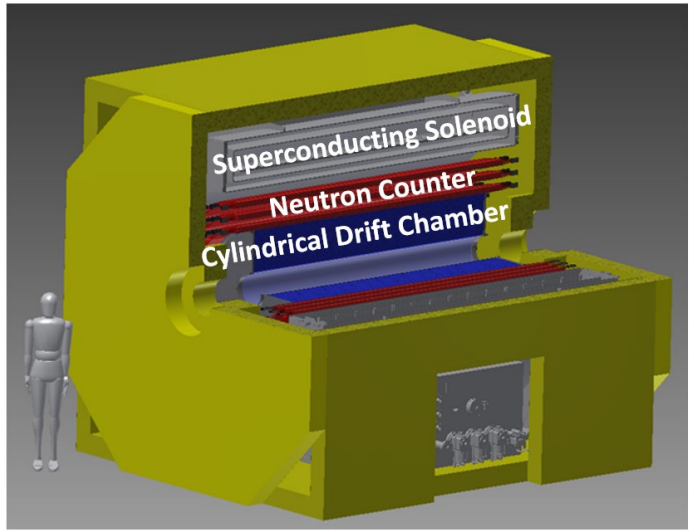
need 9 months

- **Hyp-TPC** ~ before summer of FY2025
  - ✓E72 (Λ*) 14d@80kW

need 1 year

- **New CDS with K1.8BR modification**
  - ✓E80 ($K^-ppn \rightarrow \Lambda d/\Lambda pn$) ~14+21d@90kW
  - ✓P89 ($J^P(K^-pp)$) 56d@90kW
  - ✓E57 (K^-d atm) 7d@80kW → ~30d@80kW



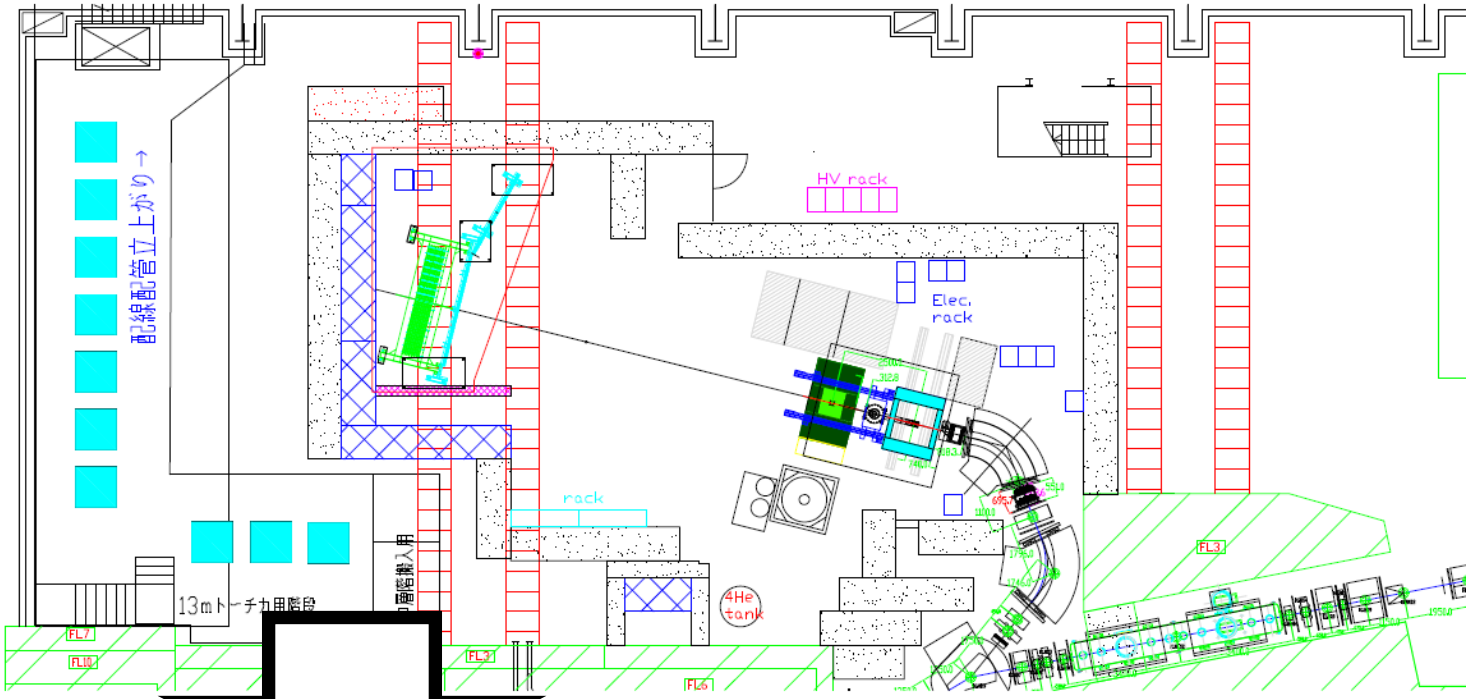


K1.8BR Upgrade

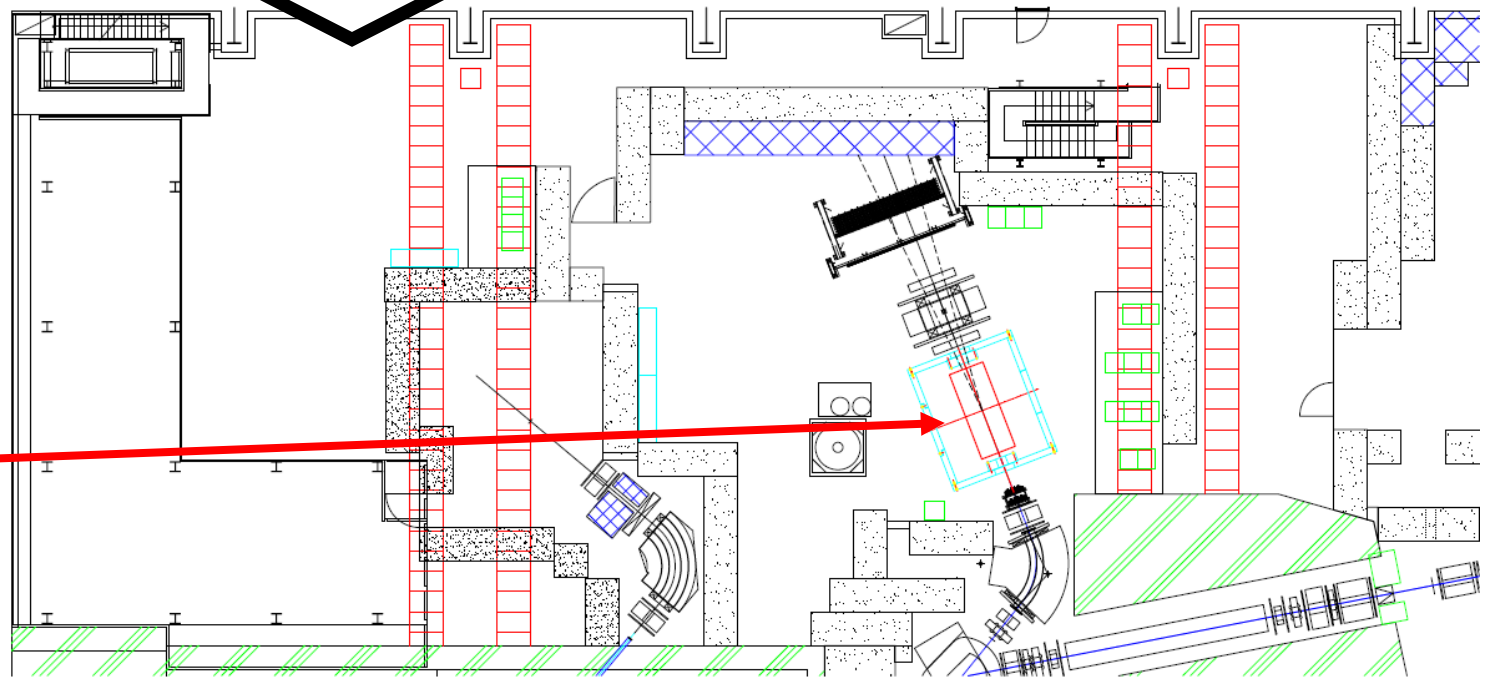
During FY2025

- Remove D5 magnet
- Rearrange shield
- Move beam-dump

before



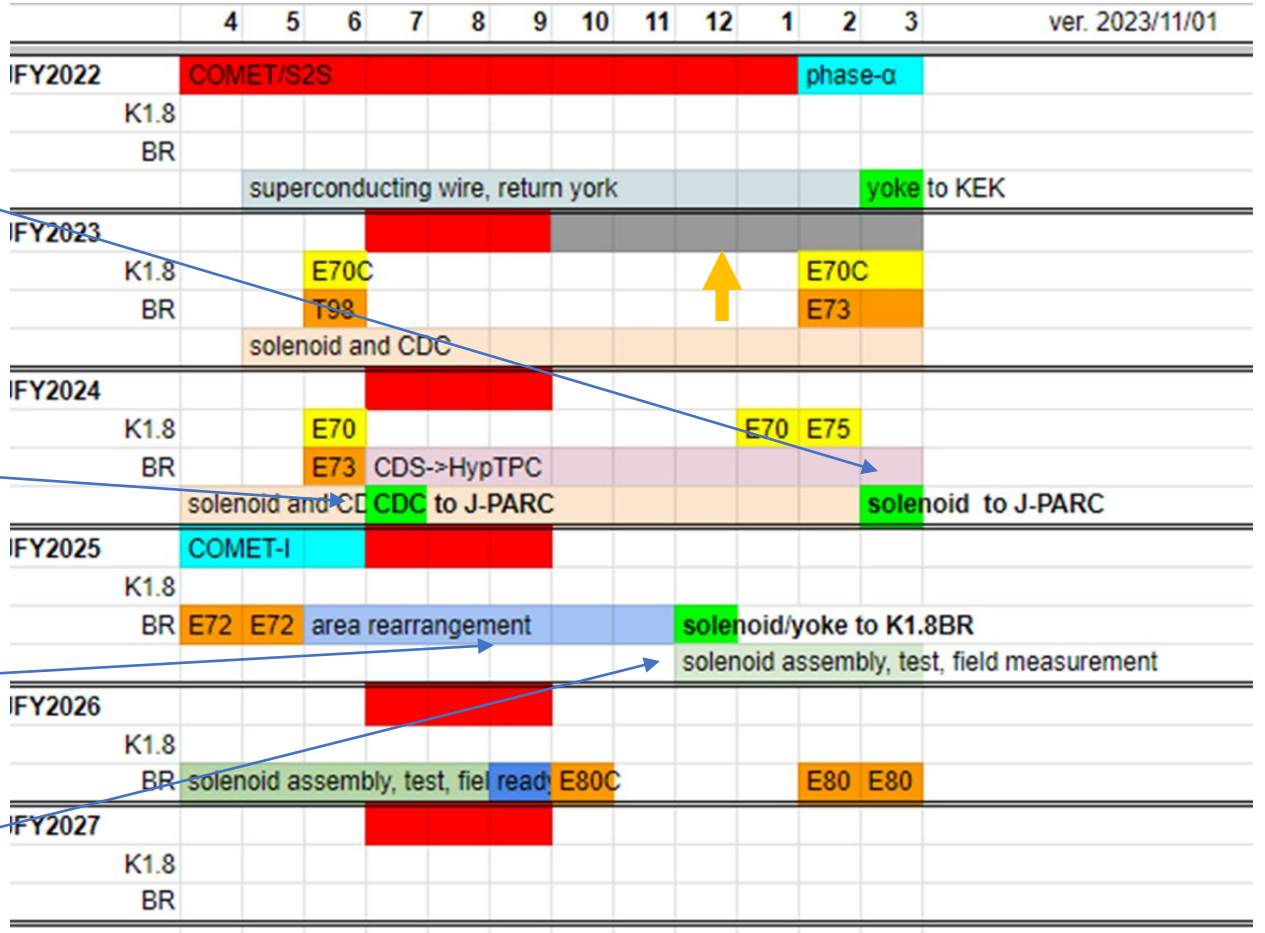
after



New CDS

Status of Construction

- **Return yoke**
  - Completed (Tsukuba KEK-ERL)
- **Superconducting solenoid magnet**
  - Under construction
  - Will be completed in the end of FY2024
- **CDC**
  - Under construction
  - Will be completed in the middle of FY2024
- **NC**
  - R&D at ELPH
  - Efforts are underway to obtain budget
- **Support structure**
  - Under design with a design firm



Strategy of the Project

- for systematic study of kaonic nuclei -

	Reaction	Decays	Key	Experiment
$\bar{K}N$	d(K$^-$,n)	$\pi^{\pm 0}\Sigma^{\mp 0}$	n/γ identification	Future
$\bar{K}$NN	**^{3}He(K$^-$,N)**	***$\Lambda p/\Lambda n$***	**polarimeter**	**P89**
$\bar{K}$NNN	**^{4}He(K$^-$,N)**	***$\Lambda d/\Lambda pn$***	**large acceptance**	**E80**
$\bar{K}$NNNN	**^{6}Li*(K$^-$,d)***	***$\Lambda t/\Lambda dn$***	**many body decay**	
$\bar{K}\alpha\alpha$	^{9}Be(K^-,n)	$\Lambda t\alpha/\Lambda dn\alpha$	*α identification*	Future
$\bar{K}\bar{K}NN$	$\bar{p}$ + ^{3}He	$\Lambda\Lambda$	$\bar{p}$ beam yield	Future (LoI)

1. Nuclear number dependence study with K-ppn and K-ppnn FY2026~
   - Many body decay measurement with the NC
   - Line shape, decay branch, Dalitz's plot → internal structure
   - Feasibility test of the polarimeter system
2. Spin/parity measurement with K-pp (and K-ppn) FY2027~?
   - Polarimeter system with straw tubes? fiber scint?
3. Heavier nuclei, such as K-$\alpha\alpha$ with ^{9}Be(K-,n)? FY2033~?
4. Double kaonic nuclei?

What we need to do?

- Stage-2 approval of E80
  - TDR re-submission in May 2024
  - Stage-2 request in July 2024 PAC

- Budget request
  - Interview for Grant-in-Aid Kiban-S on January 23, 2024 (200M JPY ~ 1.3M EURO)
  - In Italy? Austria?

- CDC construction
  - We will restart the construction after Christmas

- Design of the polarimeter
  - Straw tubes? Scintillation fibers? Outer CDC? How to install?