

Progress of the Super Tau Charm Facility (STCF) in China

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University of Science and Technology of China (USTC)



32nd Int'l Symp. on Lepton Photon Interactions at High Energies (LP2025)
Monona Convention Center, Madison, WI, USA

History of Tau-Charm Colliders*



Tau-Charm Energy Region: 2-7 GeV at e⁺e⁻ collider



ADONE, Frascati
'69 - '93



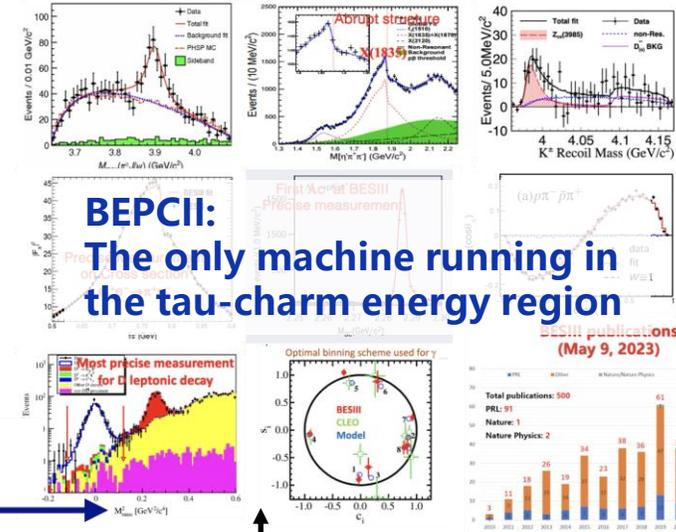
BEPC, IHEP, '90 - '04
 $5 \times 10^{30} \text{ cm}^{-2} \text{ s}^{-1}$



CESR-c, Cornell, '01 - '08
 $1 - 3 \times 10^{32} \text{ cm}^{-2} \text{ s}^{-1}$



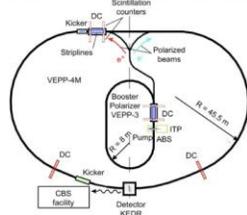
BEPCII, IHEP, '07 - now
 $1 \times 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$



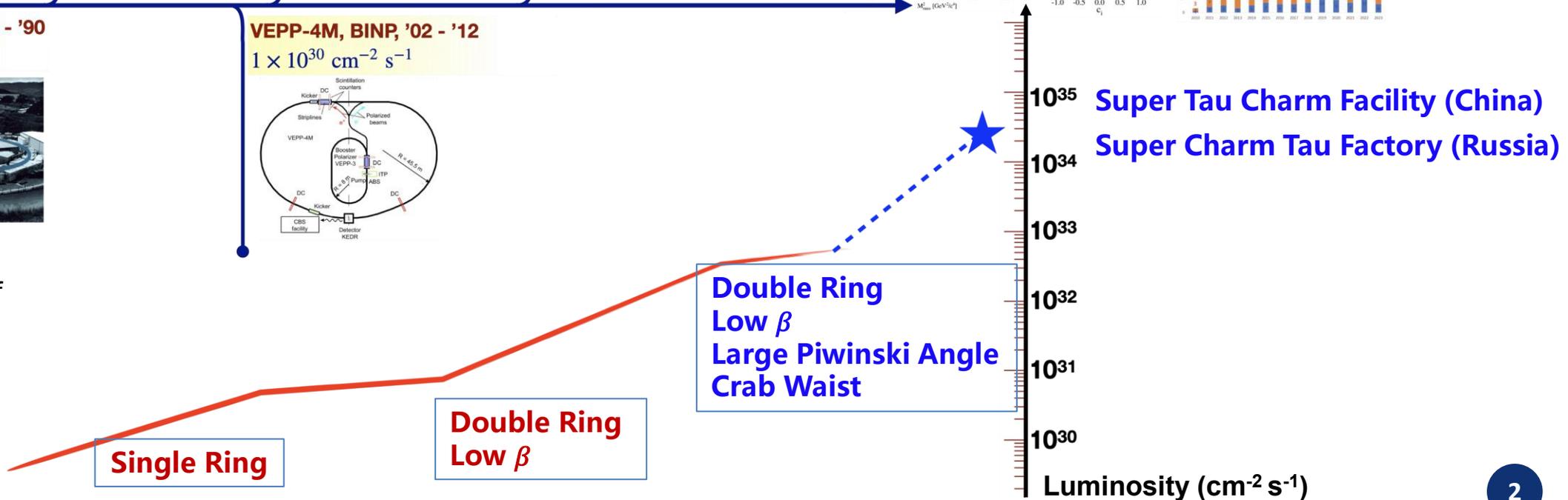
SPEAR, SLAC, '72 - '90
 $6 \times 10^{29} \text{ cm}^{-2} \text{ s}^{-1}$



VEPP-4M, BINP, '02 - '12
 $1 \times 10^{30} \text{ cm}^{-2} \text{ s}^{-1}$



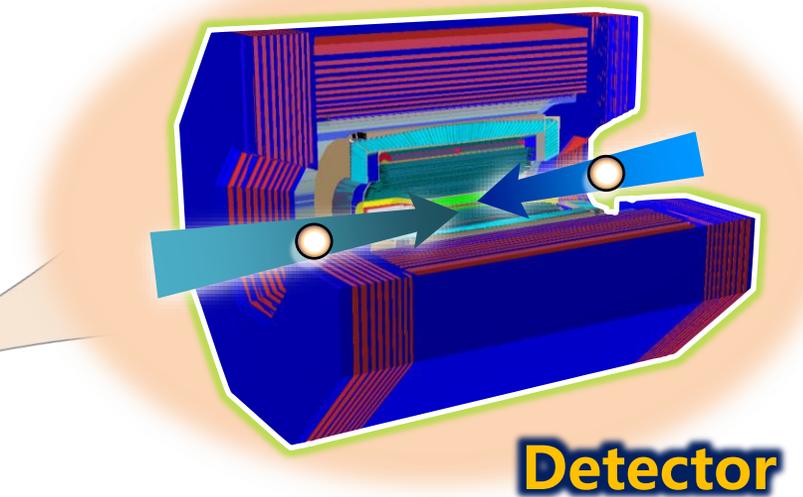
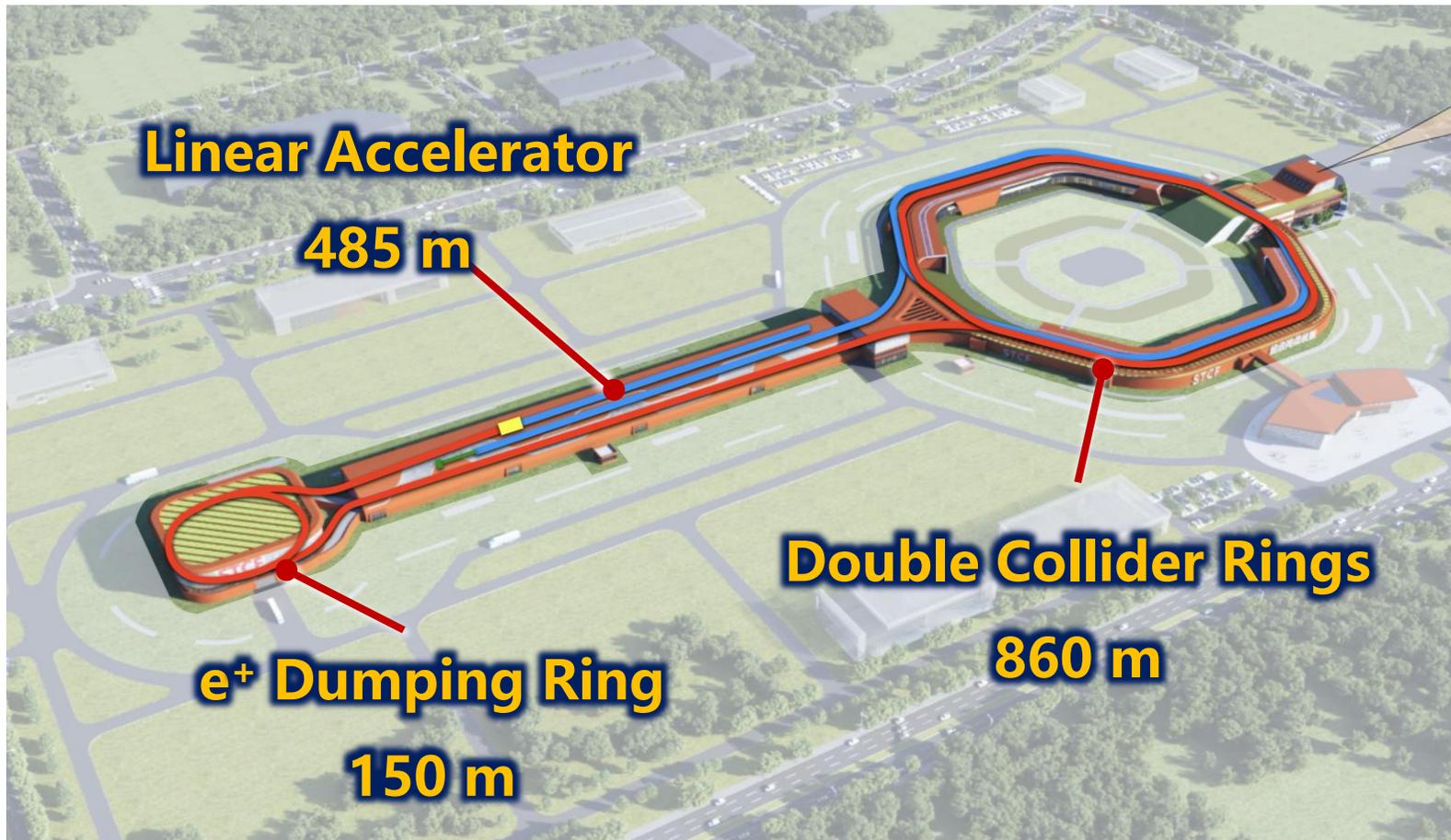
*Not an inclusive list of all tau-charm colliders



Super Tau Charm Facility (STCF)



- $E_{\text{cm}} = 2\text{-}7 \text{ GeV}$, $\mathcal{L} > 5 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$ (4 GeV)
- Site: Hefei, China



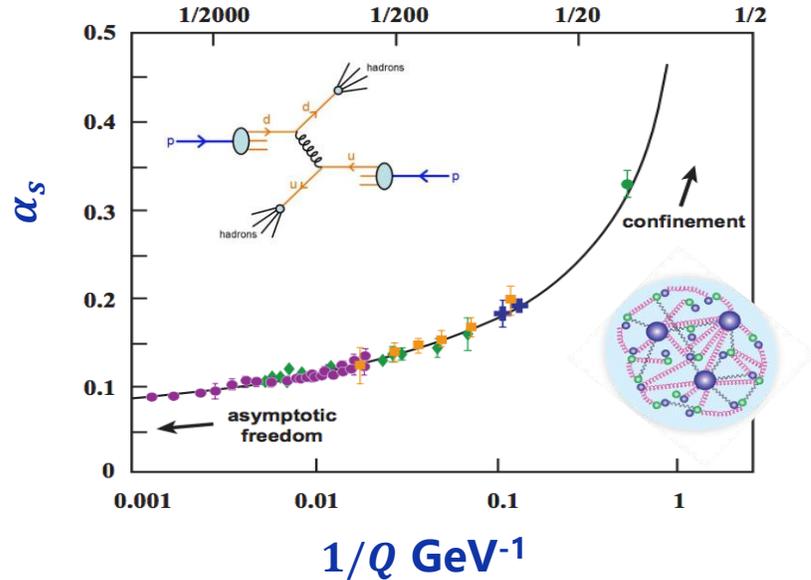
Physics flagships

- Exploring QCD and confinement
- Testing fundamental symmetries
- Making precision measurement of key physical parameters

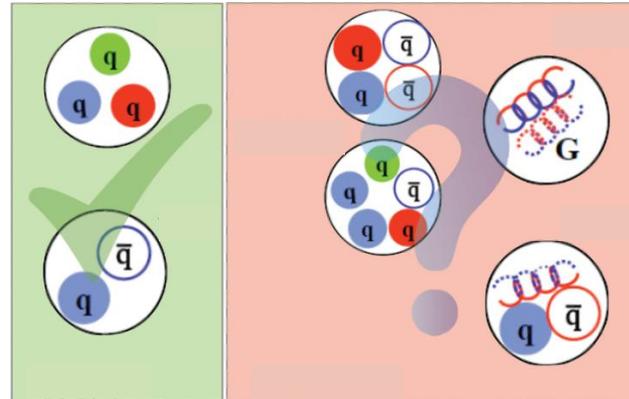
Quark Confinement

Asymptotic freedom vs. confinement

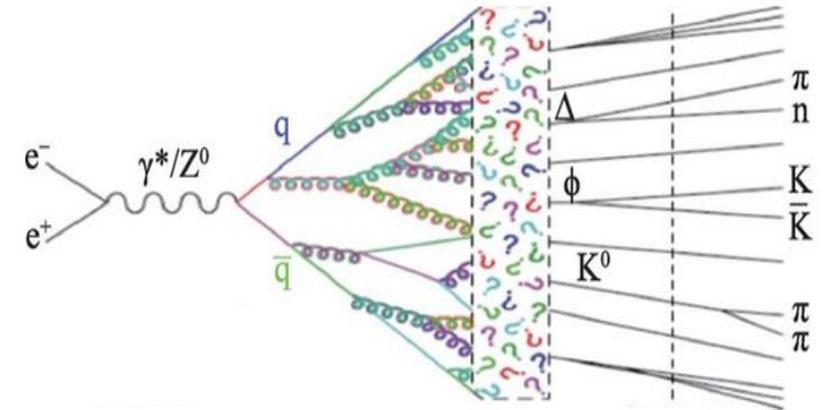
r fm



Conventional vs. exotic hadrons Static probe of confinement



Fragmentation Dynamic probe of confinement



Unraveling the nature of confinement requires summarizing the laws of hadron production and decay, and understanding how quarks and gluons distributing in hadrons

STCF will produce vast number of **charmed** and **light hadrons**, enabling studies on how quarks and gluons form hadrons and how color confinement shapes their internal structures

STCF offers unique advantages for studying **exotic hadrons** and searching for new ones

Tests of Fundamental Symmetries



Discrete symmetries play a crucial role in understanding natural laws

STCF enables **more precise tests of symmetry violations** with enormous kaons, taus, hyperons and charm hadrons:

- **CP violation:** hyperons and charmed hadrons
- **CPT violation:** neutral kaons
- **EDM:** hyperons and taus

Status of quark level CPV search

1 st Gen		2 nd Gen		3 rd Gen	
<i>u</i>	CPV prediction far below current experimental sensitivity	<i>c</i>	Charm meson: Discovered by LHCb in 2009, $O(10^{-4}) \sim \text{SM}$ Charm baryon: Not observed yet SM $O(10^{-4})$, New Physics $O(10^{-3})$	<i>t</i>	Lifetime too short, decay before hadronization, no top hadron CPV
<i>d</i>		<i>s</i>	Strange meson: Discovered in 1964, $O(10^{-3}) \sim \text{SM}$ Strange baryon: Not observed yet SM $O(10^{-4} - 10^{-5})$, New Physics $O(10^{-3})$	<i>b</i>	Bottom meson: Discovered by Babar/Belle in 2001, $O(10^{-4}) \sim \text{SM}$ Bottom baryon: Discovered by LHCb in 2025 $O(0.1) \sim \text{SM}$

Essential for rigorous SM tests and new physics searches

STCF enables high-precision measurements:

- **R-value:** Implications for new particle searches and theoretical inputs (e.g., fine-structure constant, muon g-2)
- **Tau lepton mass:** Critical for testing lepton universality
- **CKM matrix unitarity and triangle:** Violations could hint at a fourth quark generation
- α_s : Directly impacts Higgs/EW/top quark predictions

R value:
$$R \equiv \frac{\sigma^0(e^+e^- \rightarrow \text{hadrons})}{\sigma^0(e^+e^- \rightarrow \mu^+\mu^-)} \equiv \frac{\sigma_{\text{had}}^0}{\sigma_{\mu\mu}^0} \approx N_c \sum_f Q_f^2$$

LFU test:
$$\left(\frac{g_\tau}{g_\mu}\right)^2 = \frac{\tau_\mu}{\tau_\tau} \left(\frac{m_\mu}{m_\tau}\right)^5 \frac{B(\tau \rightarrow e\nu\bar{\nu})}{B(\mu \rightarrow e\nu\bar{\nu})} (1 + F_W)(1 + F_\gamma)$$

CKM matrix:

$$\begin{pmatrix} d' \\ s' \\ b' \end{pmatrix} = \begin{pmatrix} V_{ud} & V_{us} & V_{ub} \\ V_{cd} & V_{cs} & V_{cb} \\ V_{td} & V_{ts} & V_{tb} \end{pmatrix} \begin{pmatrix} d \\ s \\ b \end{pmatrix}$$

Parameters of the Standard Model

Masses			Couplings		
Parameter	Value	Method	Parameter	Value	Method
m_u	1.9 MeV	Lattice	α	0.0073	non-collider + collider
m_d	4.4 MeV	Lattice	G_F	1.17×10^{-5}	Non-collider
m_s	87 MeV	Lattice	α_s	0.12	Lattice + collider
m_c	1.3 MeV	Collider	Flavour and CP violation		
m_b	4.24 MeV	Collider	Parameter	Value	Method
m_t	173 GeV	Collider	θ_{12} (CKM)	13.1°	Collider
m_e	511 keV	Non-collider	θ_{23} (CKM)	2.4°	Collider
m_μ	106 MeV	Non-collider	θ_{13} (CKM)	0.2°	Collider
m_τ	1.78 GeV	Collider	δ (CKM-CPV)	0.995	Collider
m_z	91.2 GeV	Collider	θ (strong CP)	~ 0	Non-collider
m_H	125 GeV	Collider			

Requirements for Machine



CME (GeV)	Lumi (ab ⁻¹)	Samples	σ (nb)	No. of Events	Remarks
3.097	1	J/ψ	3400	3.4×10^{12}	
3.670	1	$\tau^+ \tau^-$	2.4	2.4×10^9	
3.686	1	$\psi(3686)$	640	6.4×10^{11}	
		$\tau^+ \tau^-$	2.5	2.5×10^9	
3.770	1	$\psi(3686) \rightarrow \tau^+ \tau^-$		2.0×10^9	
		$D^0 \bar{D}^0$	3.6	3.6×10^9	Single tag Single tag
		$D^+ \bar{D}^-$	2.8	2.8×10^9	
		$D^0 \bar{D}^0$		7.9×10^8	
		$D^+ \bar{D}^-$		5.5×10^8	
$\tau^+ \tau^-$	2.9	2.9×10^9			
4.009	1	$D^{*0} \bar{D}^{*0} + c.c.$	4.0	1.4×10^9	CP _{D⁰D⁰} = + CP _{D⁰D⁰} = -
		$D^{*0} \bar{D}^0 + c.c.$	4.0	2.6×10^9	
		$D_s^+ D_s^-$	0.20	2.0×10^8	
		$\tau^+ \tau^-$	3.5	3.5×10^9	
4.180	1	$D_s^{*+} D_s^- + c.c.$	0.90	9.0×10^8	Single tag
		$D_s^{*+} D_s^+ + c.c.$		1.3×10^8	
		$\tau^+ \tau^-$	3.6	3.6×10^9	
4.230	1	$J/\psi \pi^+ \pi^-$	0.085	8.5×10^7	
		$\gamma X(3872)$	3.6	3.6×10^9	
4.360	1	$\psi(3686) \pi^+ \pi^-$	0.058	5.8×10^7	
		$\tau^+ \tau^-$	3.5	3.5×10^9	
4.420	1	$\psi(3686) \pi^+ \pi^-$	0.040	4.0×10^7	
		$\tau^+ \tau^-$	3.5	3.5×10^9	
4.630	1	$\psi(3686) \pi^+ \pi^-$	0.033	3.3×10^7	Single tag
		$\Lambda_c \bar{\Lambda}_c$	0.56	5.6×10^8	
		$\Lambda_c \bar{\Lambda}_c$		6.4×10^7	
		$\tau^+ \tau^-$	3.4	3.4×10^9	
4.0-7.0	3	300-point scan with 10 MeV steps, 1 fb ⁻¹ /point			
> 5	2-7	Several ab ⁻¹ of high-energy data, details dependent on scan results			

STCF data: 1 ab⁻¹ / year
(assuming 1 year per energy)



STCF sensitivities
(based on fast sim)

Physics goal	Observable	BESIII	Current world best	STCF prospect(1 ab ⁻¹)
Fundamental Symmetry	A_{CP} in hyperon decay	0.005	0.005	$\mathcal{O}(10^{-4})$
	weak phase in hyperon decay	1.2°	1.2°	0.04°
	Δ_{CP} in tau decay	-	0.25%	$\mathcal{O}(10^{-3})$
	EDM of hyperon	-	$\mathcal{O}(10^{-16})$ ecm	$\mathcal{O}(10^{-21})$ ecm
	EDM of tau	-	$\mathcal{O}(10^{-17})$ ecm	$\mathcal{O}(10^{-18})$ ecm
	cLFV in $\tau \rightarrow \mu\mu\mu$	-	2.1×10^{-8}	$\mathcal{O}(10^{-9})$
Quark Confinement	cLFV in $J/\psi \rightarrow e\mu$	4.5×10^{-9}	4.5×10^{-9}	$\mathcal{O}(10^{-11})$
	cLFV in $J/\psi \rightarrow e\tau$	7.5×10^{-8}	7.5×10^{-8}	$\mathcal{O}(10^{-10})$
	$N_{Y(4260)/Z_c(X(3872))}$	$10^7/10^6/10^4$	$10^6/10^5/10^6$	$10^9/10^8/10^6$
	Pentaquarks	-	P_{cs} in $J/\psi p(\Lambda)$	$\sigma_{J/\psi pp} \approx 4$ fb
	Di-charmonium	-	di- ψ	$\sigma_{J/\psi cc} \approx 10$ fb
	$N_{J/\psi/\psi(3686)}$	$10^{10}/10^9$	$10^{10}/10^9$	$10^{12}/10^{11}$
Physical Quantities	Collins effects	0.3	0.3	$\mathcal{O}(10^{-3})$
	Baryon form factors	10%	10%	$\mathcal{O}(10^{-2})$
	R value	3%	3%	$\mathcal{O}(10^{-3})$
	tau mass	160 keV	120 keV	$\mathcal{O}(10)$ keV
	$ V_{us} $	-	1%	$\mathcal{O}(10^{-3})$
	$ V_{cd} $	1.2%	1%	$\mathcal{O}(10^{-3})$
Sys. unc. of γ from D decay	$ V_{cs} $	1.4%	1.4%	$\mathcal{O}(10^{-3})$
		0.4°	0.4°	0.1°
	α_s	-	1.5%	$\mathcal{O}(10^{-3})$

Accelerator

CM energy range:

- $E_{cm} = 2-7$ GeV

Luminosity:

- $\mathcal{L} > 0.5 \times 10^{35}$ cm⁻² s⁻¹

Detector

Tracking:

- efficiency > 99% (> 0.3 GeV/c), 90% (~0.1 GeV/c)
- $\sigma_p/p = 0.5\%$, $\sigma_{p_{pos}} = 130$ um (1 GeV/c)

PID:

- PID efficiency > 97% ($p < 2$ GeV/c)
- $K-\pi$ misID rate < 2%
- μ/π suppression power > 30 ($p < 2$ GeV/c)

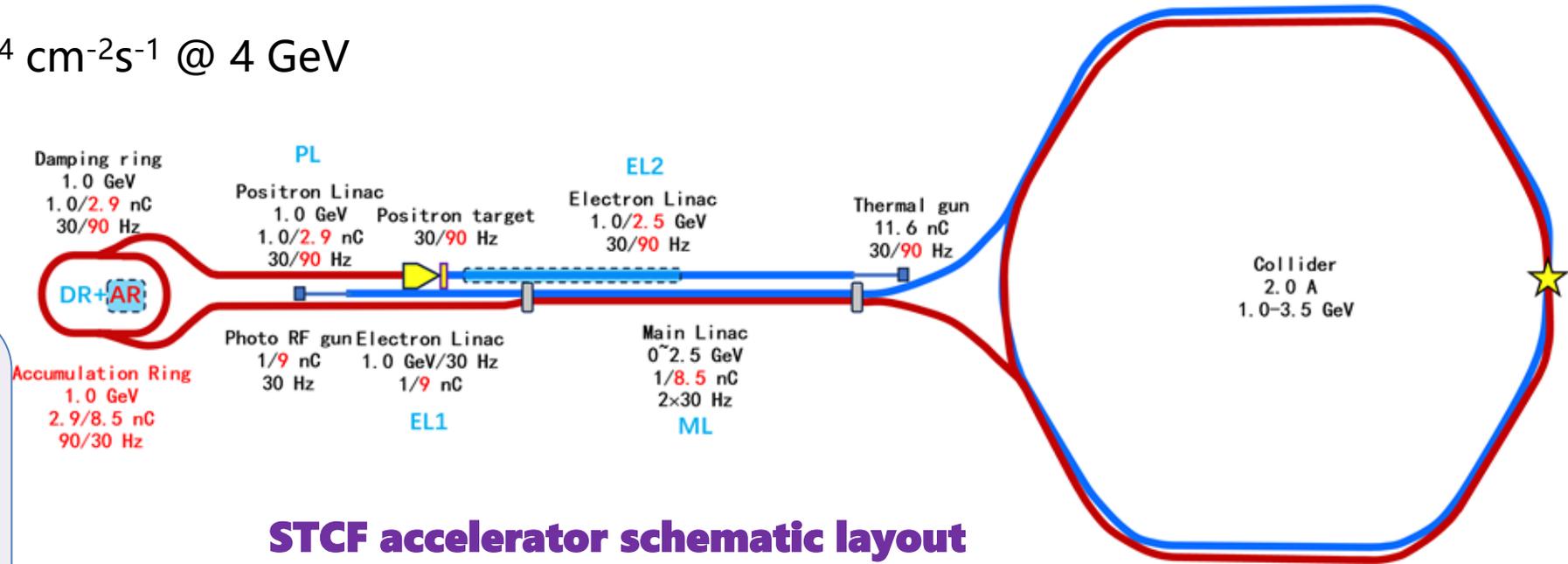
EMCal:

- $\sigma_E/E \sim 2.5\%$, $\sigma_{p_{pos}} = 5$ mm (1 GeV)

Accelerator Design

Core design goal:

- CM energy 2-7 GeV
- Luminosity $> 5 \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$ @ 4 GeV



Injector:

- full-energy linac
- positron DR or AR for different injection modes

STCF accelerator schematic layout

Double-Ring Collider

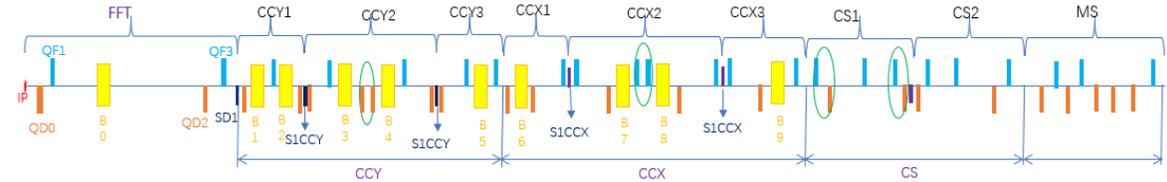
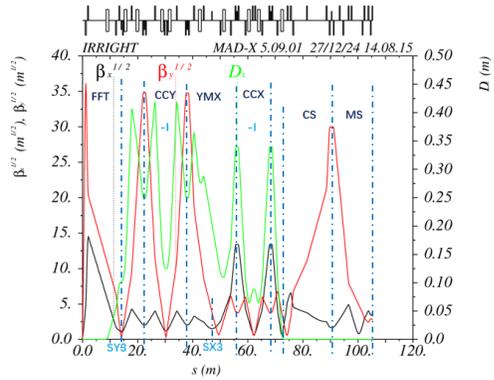
- low emittance
- high current
- large Piwinski angle
- Crab-waist collision scheme

CM (GeV)	2.0	3.0	4.0	7.0
Simulated lumi. ($\text{cm}^{-2}\text{s}^{-1}$)	6.2×10^{33}	2.1×10^{34}	9.4×10^{34}	4.5×10^{34}

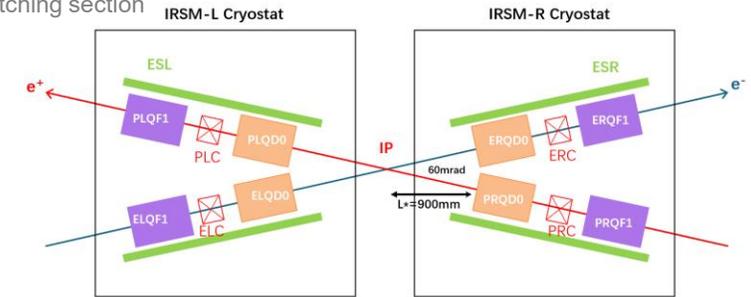
Accelerator – Collider Rings

IR design

- Length ~ 200 m, bending 60°
- Crossing angle: 60 mrad
- β_y^* : 0.8 mm
- CCT SC quadrupole magnets

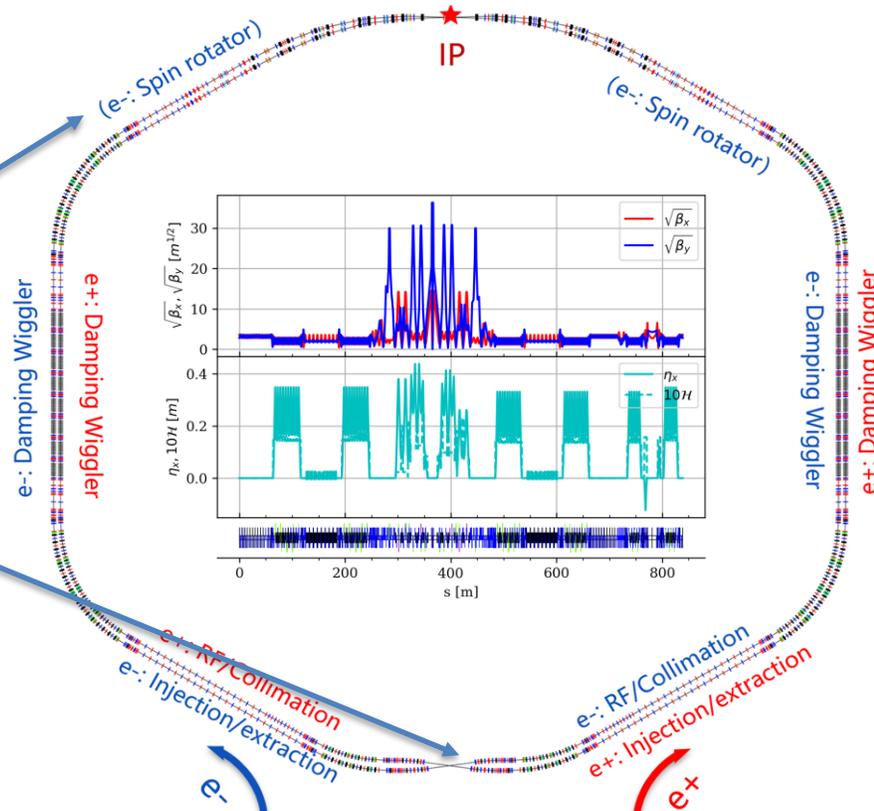


- FFT: final focus telescope
- CCY/CCX: local chromaticity correction
- CS: crab sextupoles
- MS: matching section



Space reserved for upgrades:

- Spin rotator
- Second IP



Damping Wiggler

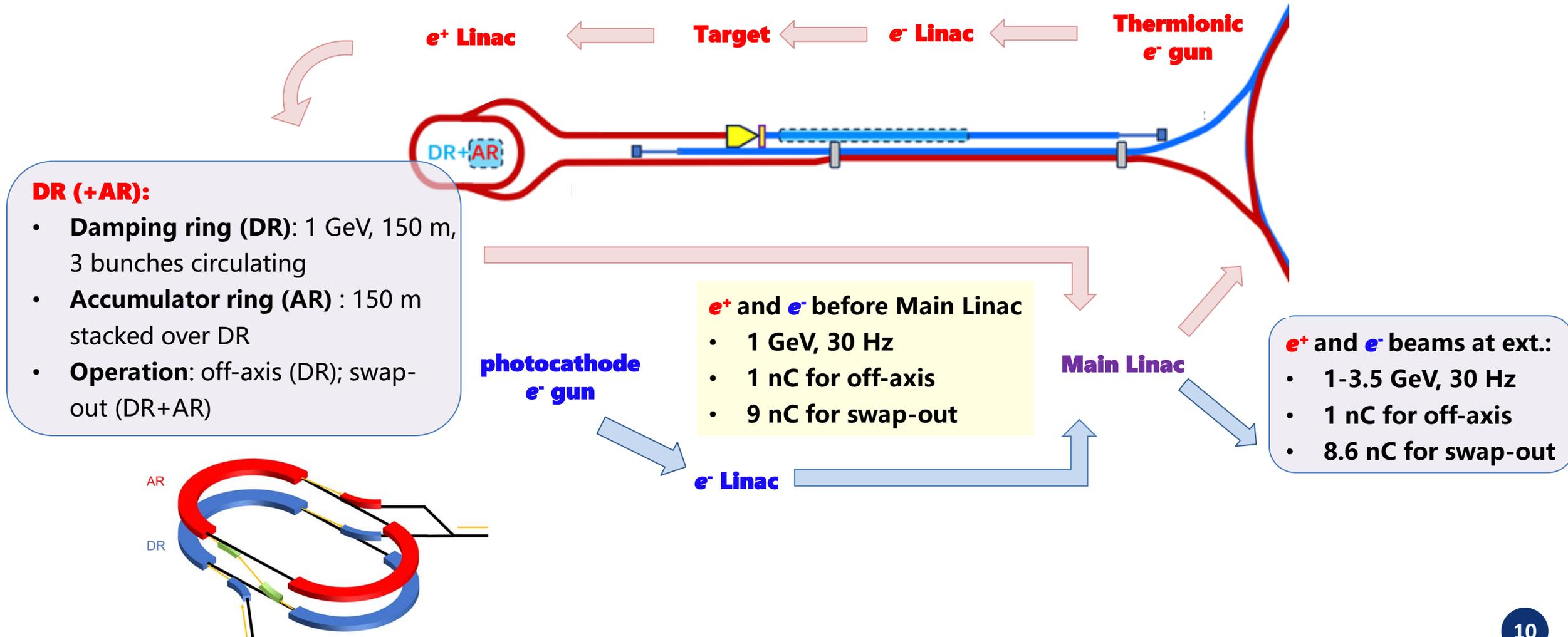
- Adjusting damping time, energy spread, emittance

RF cavity

- RT TM020-mode cavity

Accelerator – Injector

A compatible injector for off-axis and swap-out injections



Accelerator R&D Progress



Conceptual Design Report

- Accelerator -

(draft)

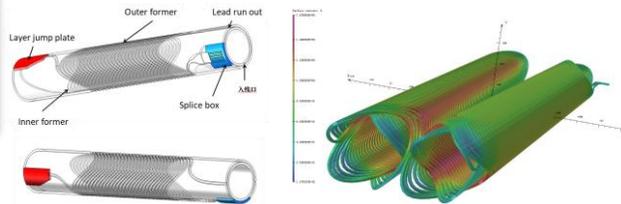
STCF study team

May 9, 2025

Accelerator CDR completed and reviewed in May 2025
Key technology R&D and prototyping on going

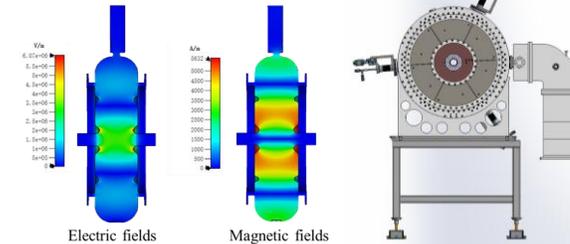
IR SC Magnets

Focus on the QD0, CCT, Vertical test in early 2026



Room-Temperature RF Cavity

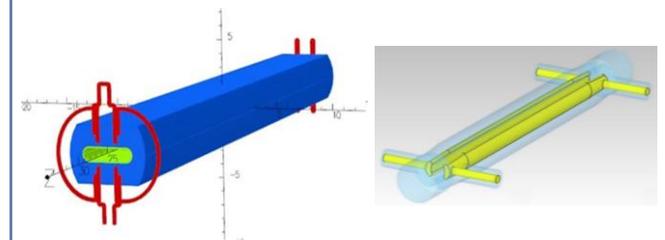
TM020-mode



Kicker Magnets

Nonlinear kicker

Ultrafast kicker



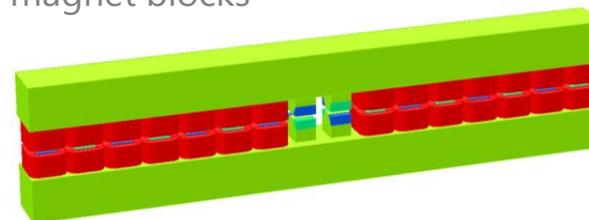
Bunch by Bunch Profile Monitor

Beam tests in different facilities (SSRF, HLS, DLS)



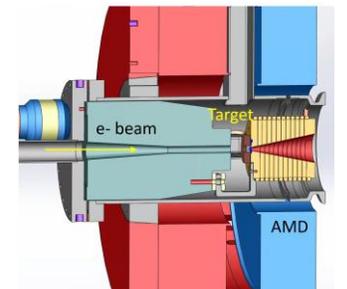
Damping Wigglers

RT electromagnetic wigglers, hybrid structure with permanent magnet blocks



Conventional Positron Source

To be test in dedicated test beam platform



STCF Detector Design

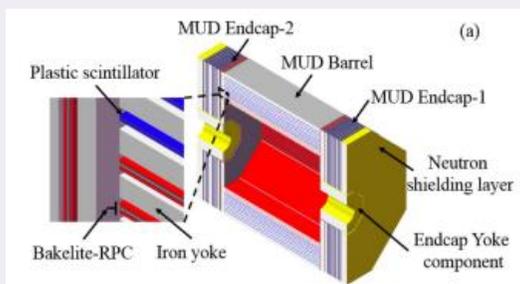


Core design goal:

- Efficient and precise reconstruction of exclusive final states
- Precise measurement of low- p particles (< 1 GeV)
- Outstanding PID: π/K and μ/π separation up to 2 GeV

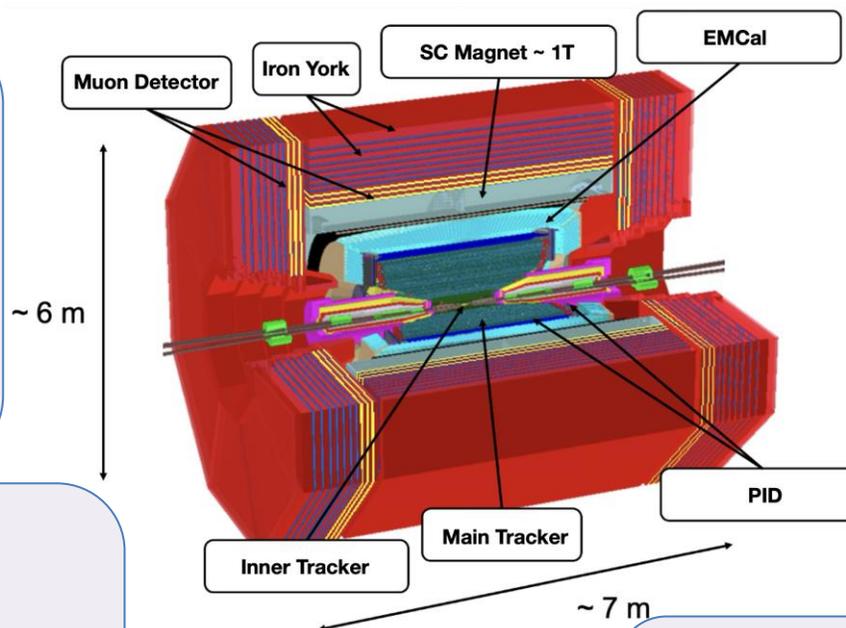
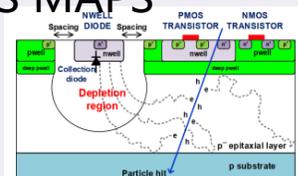
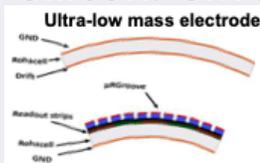
Muon detector

- RPC + scintillator strips



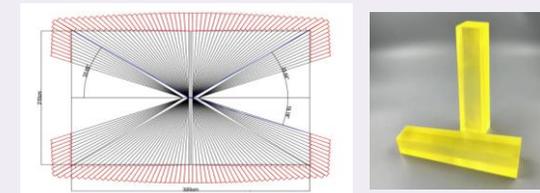
Inner tracker

- OPT1-MPGD: cylindrical MPGD (μ RGroove)
- OPT2-Silicon: CMOS MAPS



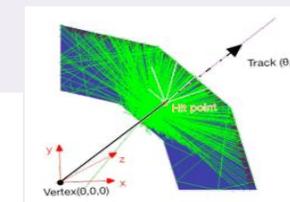
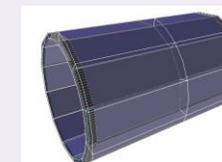
EMCal

- Pure Cesium iodide (CsI) + APD



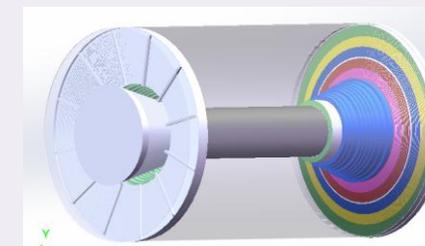
PID

- Endcap: DIRC-like TOF (D_{TOF})
- Barrel:
 - OPT1-D_{TOF}
 - OPT2-RICH



Main tracker

- Drift chamber



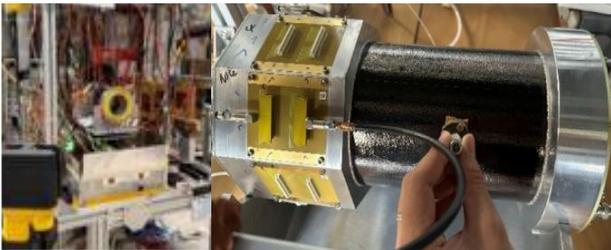


Detector R&D Progress

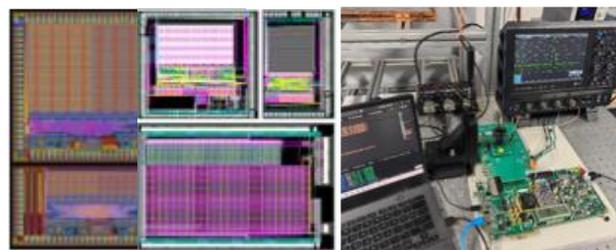


Detector and Physics CDR published in 2023
Key technology R&D and prototyping on going

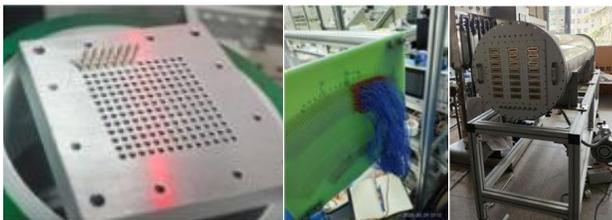
Cylindrical μ RGroove prototype



ITK: CMOS prototype chips



Main tracker full length prototype



PID prototype



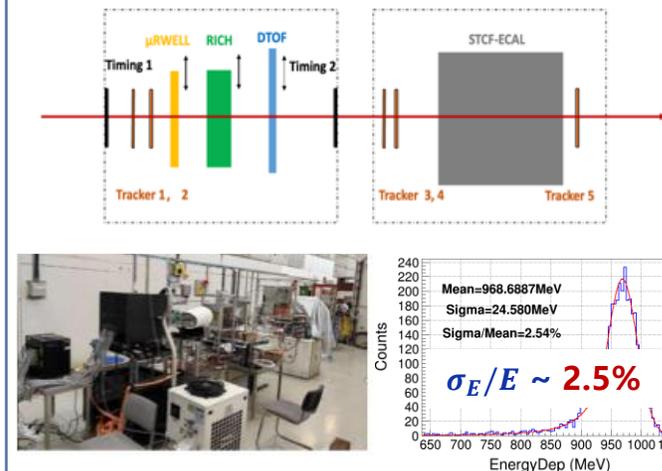
EMCal: 5 X 5 prototype



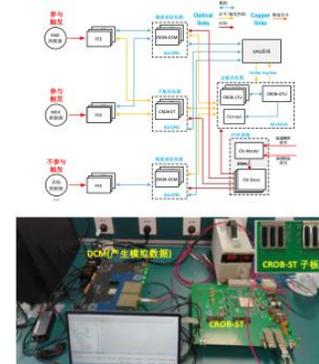
Muon: Plastic Scintillator+ RPC



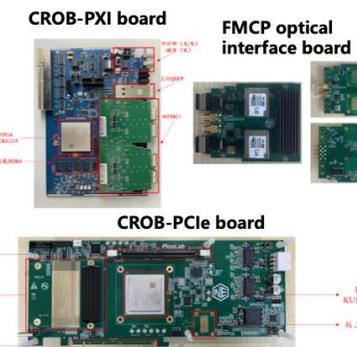
Beam Test at CERN



Trigger



DAQ



Offline Software & Full Simulation

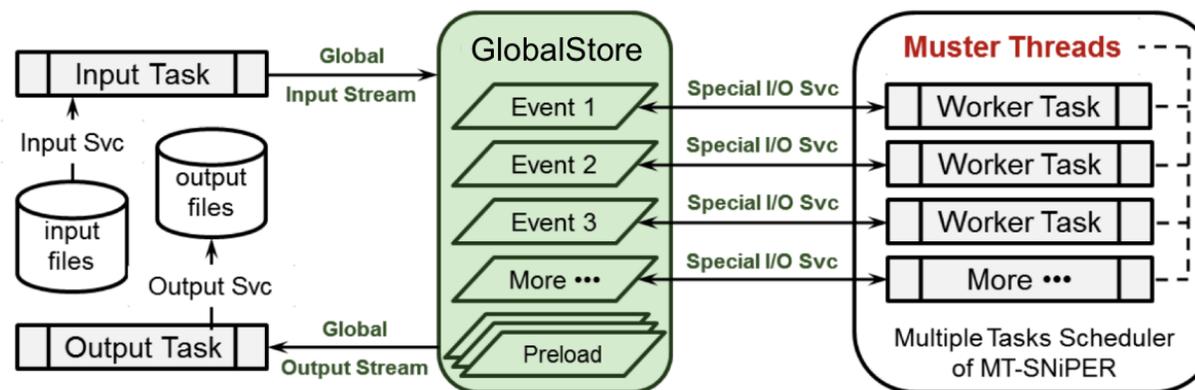
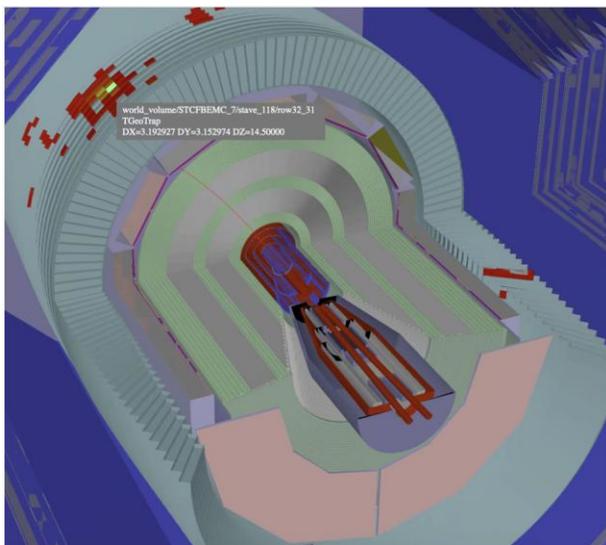
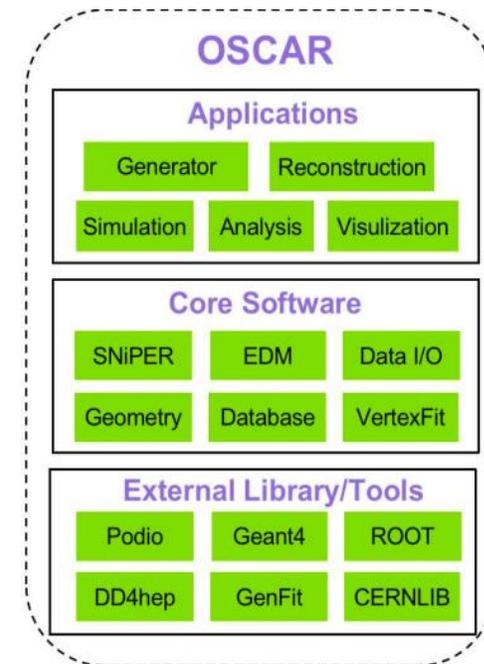


Offline Software System of Super Tau Charm Facility (**OSCAR**)

External Interface + Framework + Offline + Event display

SNiPER framework provides common functionalities for data processing

Full simulation under OSCAR is undergoing to study the physics sensitivities and optimize detector design, CPU consumption and event size comparable to BESIII



JINST 18 P03004

Preliminary Project Timeline

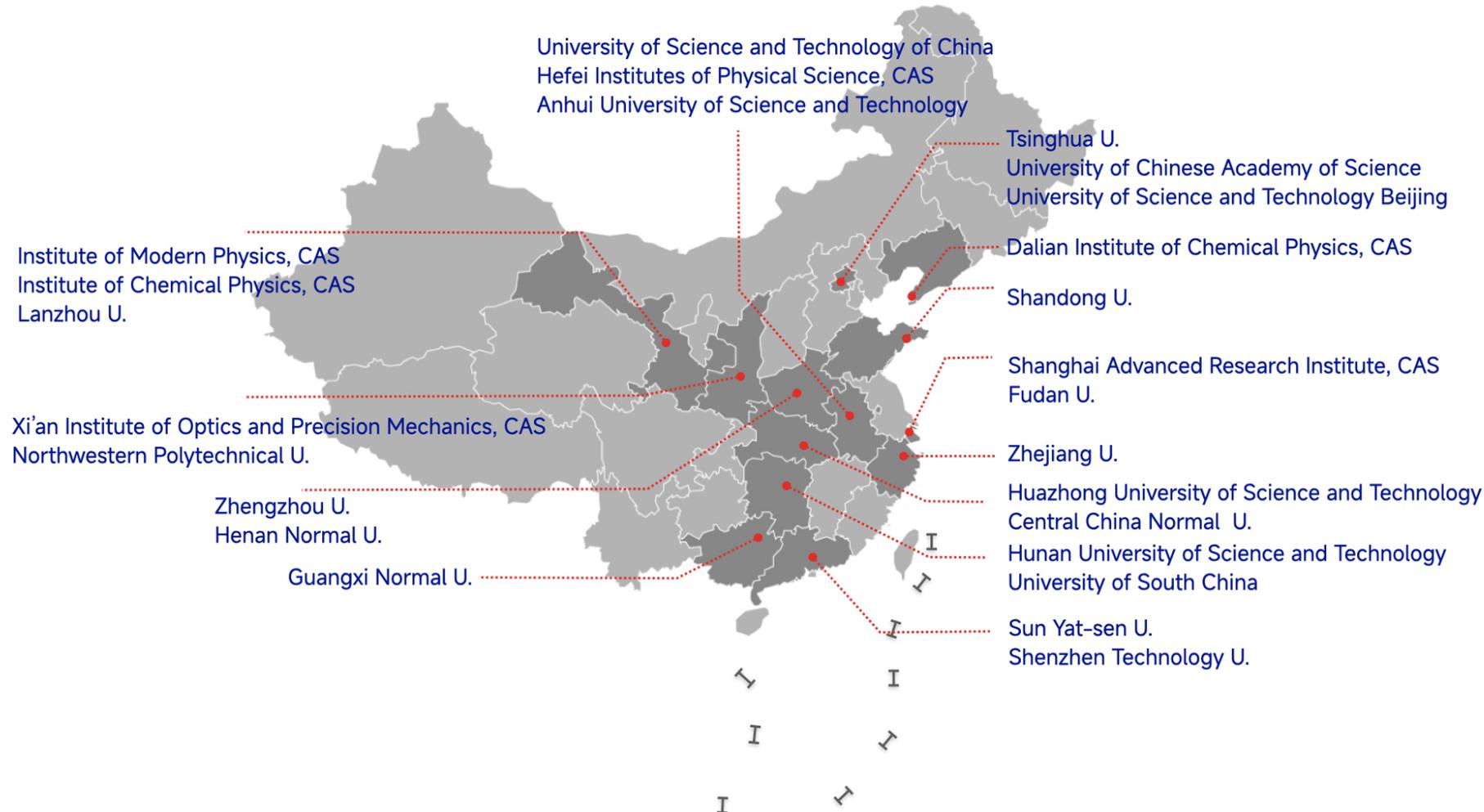


- 14th five-years plan: Conceptual design and R&D, 400M CNY
- 15th five-years plan: Construction 6 years, ~5B CNY
- Operating for 20+ years, then upgrade

Key Tech. R&D Team



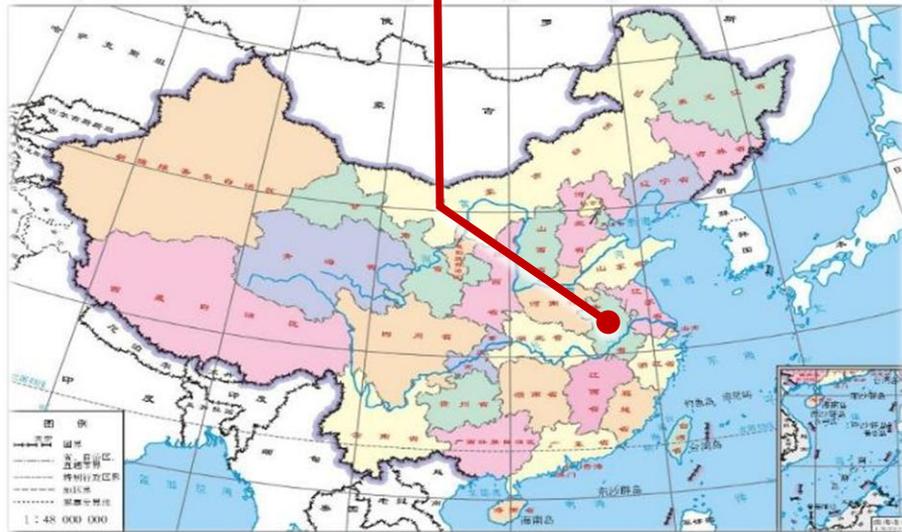
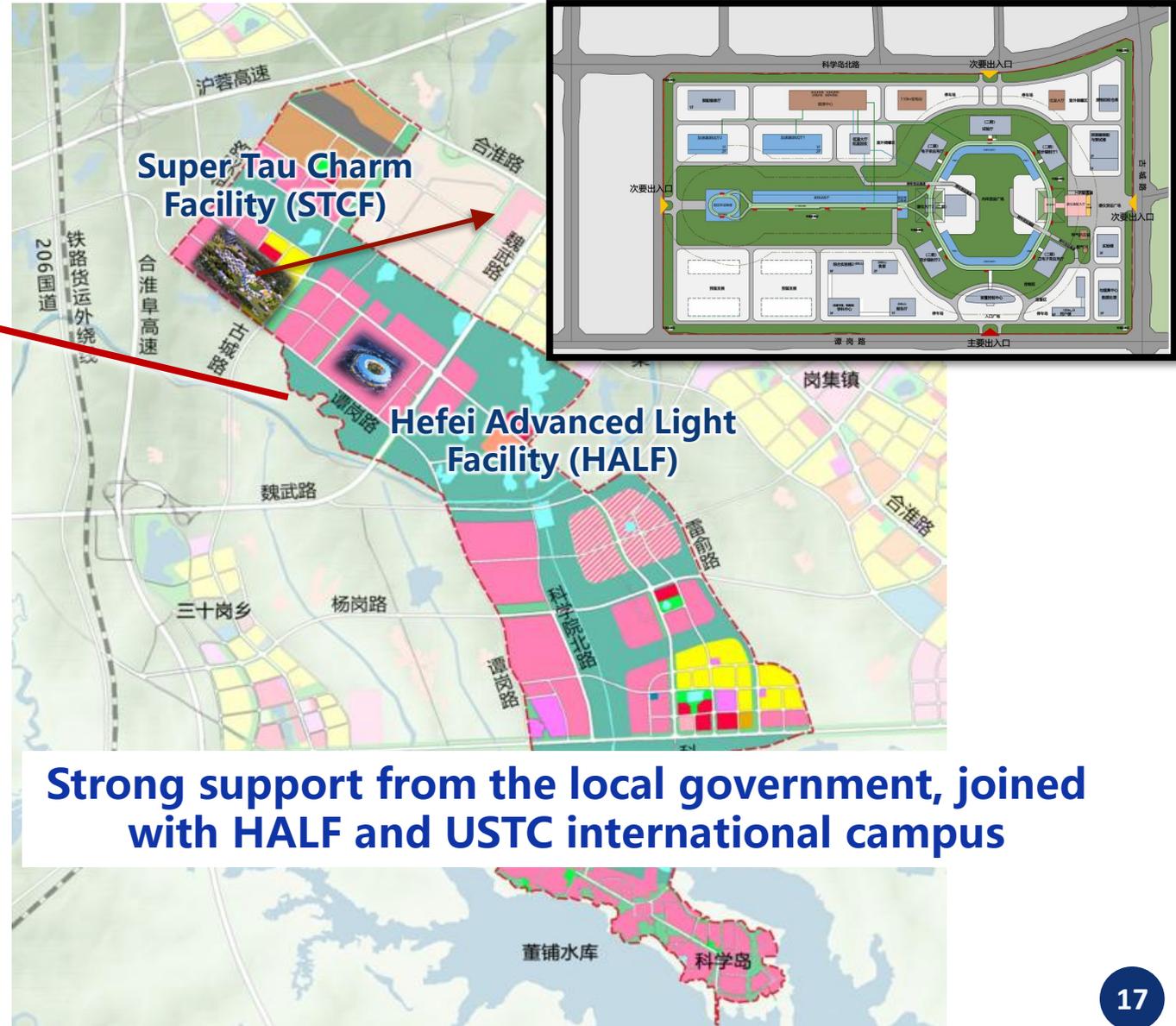
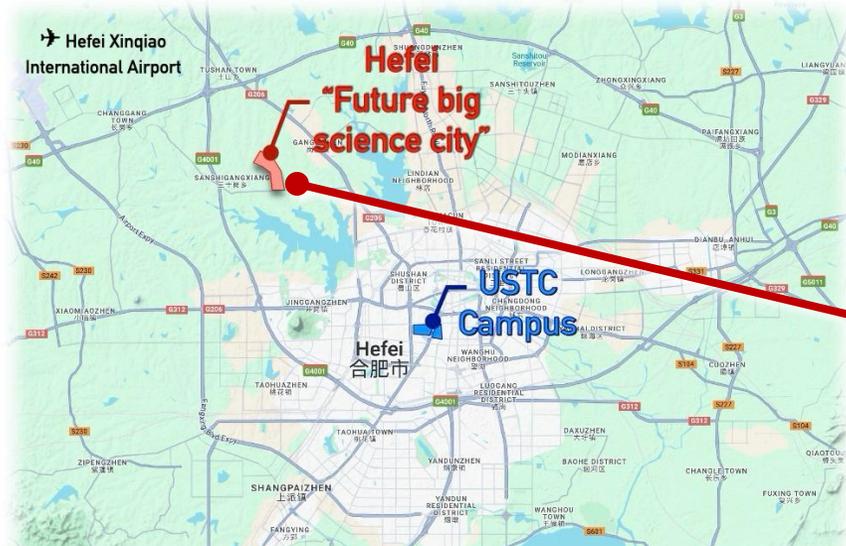
25 Universities/Institutes in R&D project:
240 faculties and 300 graduate students



Physics Research

Institute of theoretical physics, CAS
Institute of High energy physics, CAS
Tsung-Dao Lee Institute
Perking University
Shanghai Jiao Tong University
Nanjing University
Wuhan University
Nankai University
South China Normal University
Beijing Normal University
China University of Geosciences
Liaoning University
Nanjing Normal University
Hebei Normal University
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Site: Future Big Science City, Hefei



Time	Place	Content
2015.01	Hefei, China	Workshop on Super tau-Charm Facility in China
2018.03	Beijing, China	Workshop on Super tau-Charm Facility in China
2018.05	Novosibirsk, Russia	Workshop on Super tau-Charm Facility in Russia
2018.12	Paris, France	1 st FTCF (Joint International Workshop)
2019.08	Moscow, Russia	2 nd FTCF
2020.11	Online	3 rd FTCF
2021.11	Online	4 th FTCF
2024.01	Hefei, China	5 th FTCF
2024.11	Guangzhou, China	6 th FTCF



6th FTCF - Guangzhou

- 200+ attendees from 20+ countries
- 125 talks: 20 plenary, 105 parallel

The 7th International Workshop on Future Tau Charm Facilities (FTCF 2025)

Huangshan (aka. Yellow Mountain), China

Nov. 23 - 27, 2025

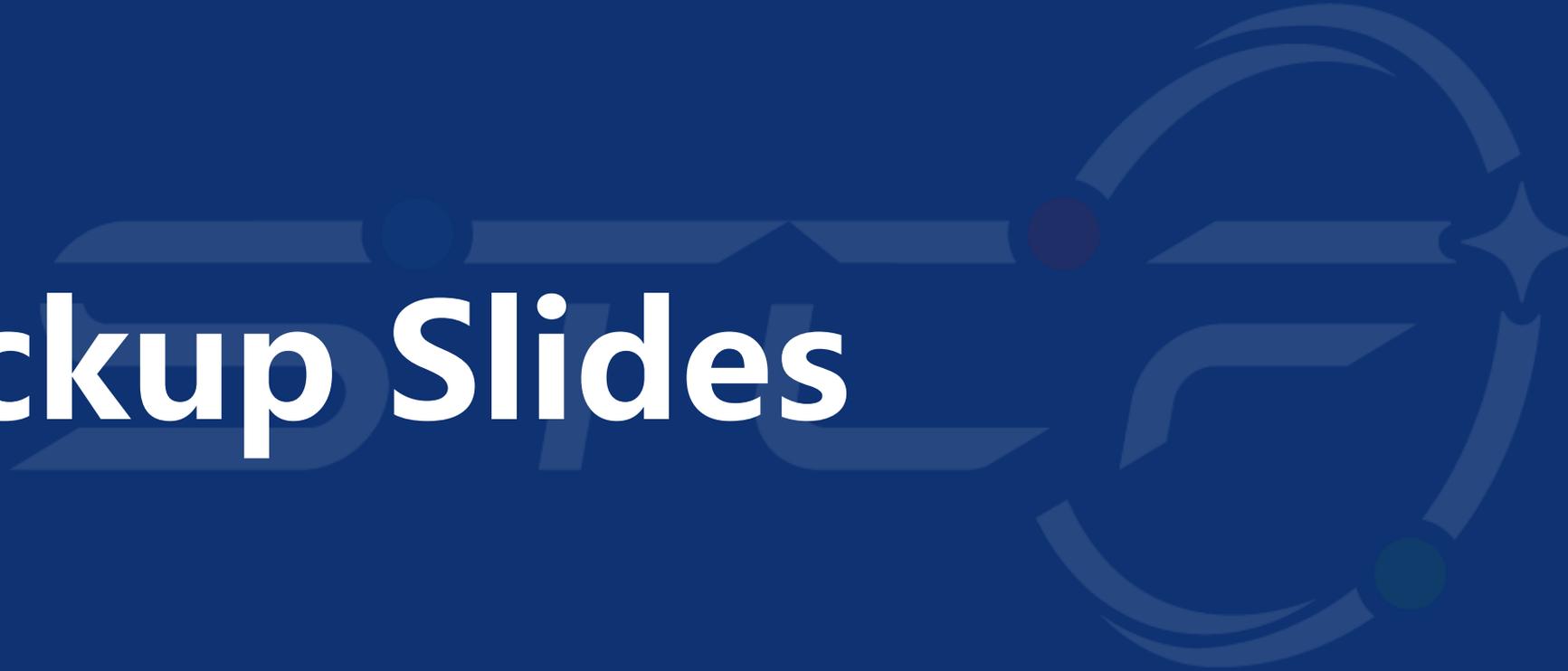
<https://indico.pnp.ustc.edu.cn/event/4580/>



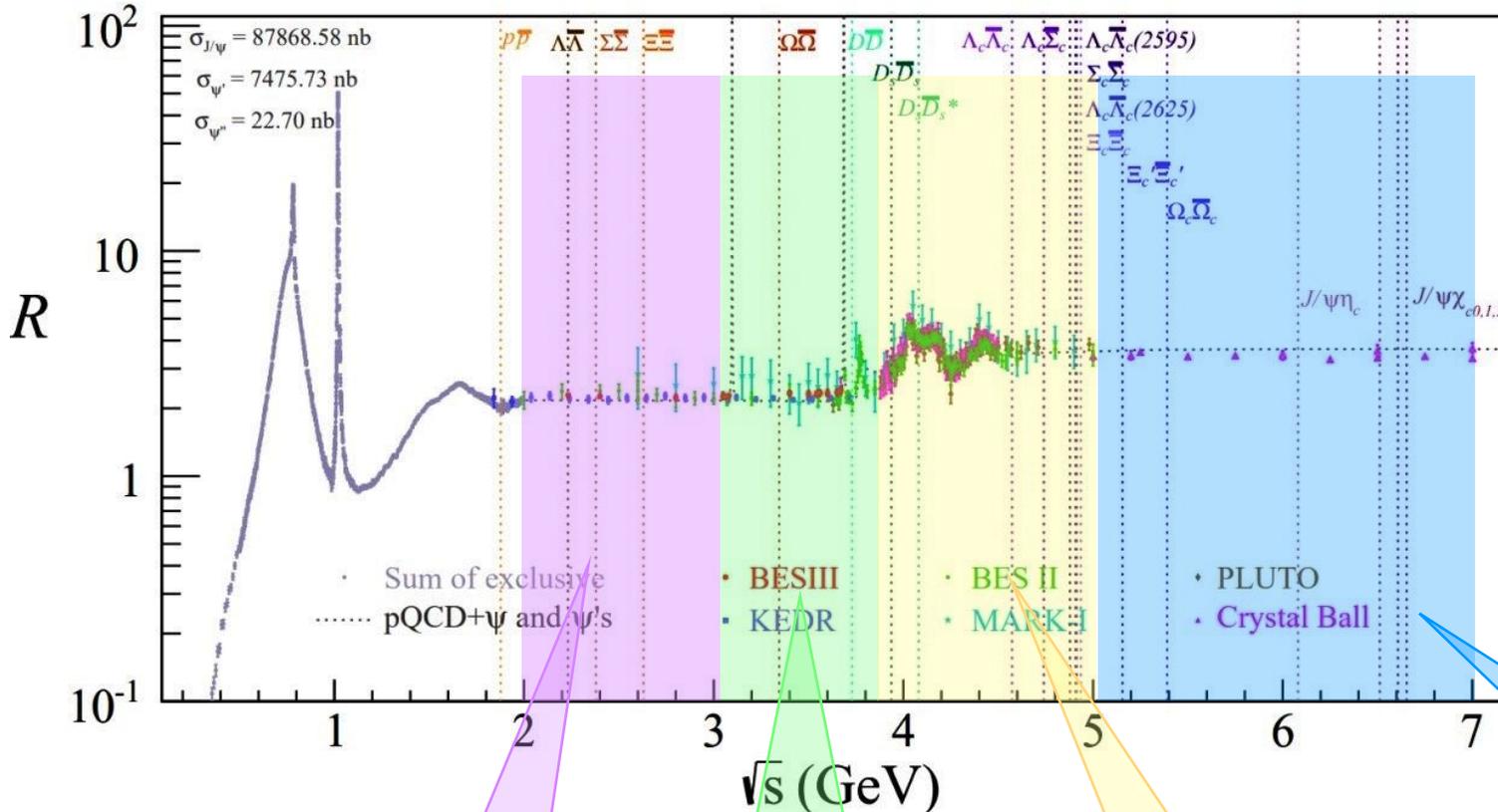
- **STCF has a rich physics program in tau-charm region: how quarks form matter, symmetry of fundamental interactions (CPV), and precision physical parameters**
- **Key technology R&D on track; critical challenges being addressed**
- **Well organized project with significant progresses achieved**
- **International collaboration expanding; synergies and in-depth collaboration with global projects actively pursued**

Thank you for your attention

Backup Slides



Tau-Charm Energy Region



Tau-charm Energy Region 2-7 GeV at e^+e^- collider

- Transition region between perturbative and non-perturbative QCD
- Pair production of hadrons and τ 's at threshold
- Rich resonant structures, large production cross-sections for charmonium states and charmonium-like exotics

- Nucleon/Hadron form factors
- $Y(2175)$ resonance
- Multiquark states with s quark
- MLLA/LPHD and QCD sum rule predictions

- Light hadron spectroscopy
- Gluonic and exotic
- LFV and CPV
- Rare and forbidden decays
- τ lepton

- XYZ particles
- Physics with D mesons
- f_D and f_{D_s}
- $D^0 - \bar{D}^0$ mixing
- Charm baryons

- Hadron fragmentation
- New XYZ particle
- Hidden-charm pentaquark
- Di-charmonium state
- Charm baryons

Physics Flagships at STCF



Tests of fundamental Symmetries

- CP : Hyperons, tau, EDM
- CPV : $K^0 - \bar{K}^0$ system
- CLFV : Tau, meson decays

Exploring QCD nature and confinement

- Fragmentation function
- Hadron Spectroscopy
- Nuclear Structure

Precision Measurement of Fundamental Physical Parameters

- R-Value, Tau mass
- CKM elements
- Running of fine structure constant $\Delta\alpha_{em}$

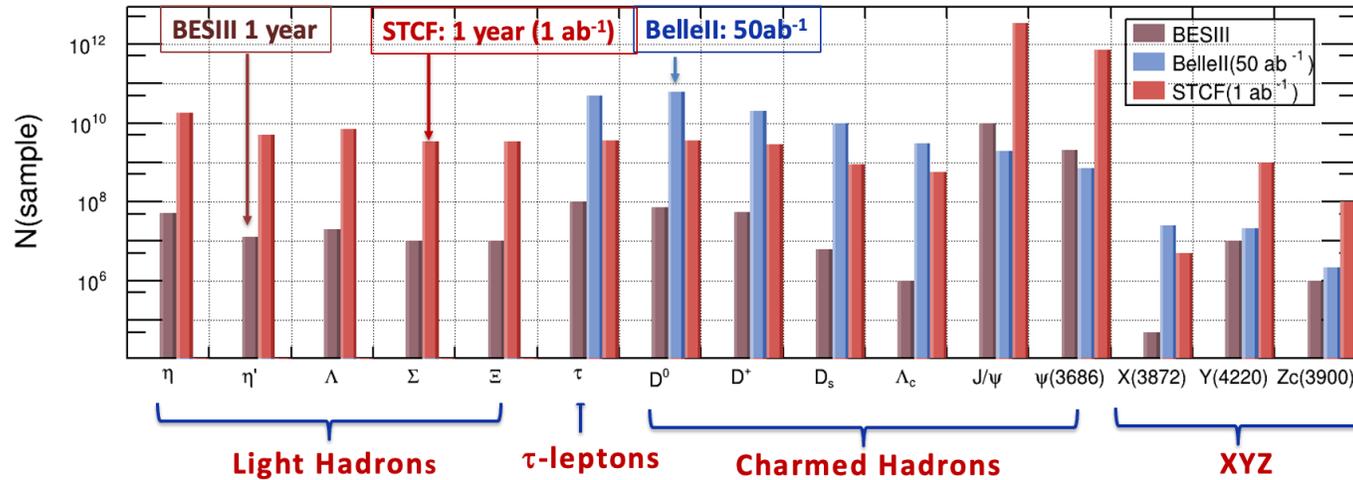
Three-fold physics flagships

STCF aims to reveal the mystery of how quarks form matter and the symmetry of fundamental interactions

Expected Data Production at STCF



STCF (per year) vs. BEPCII (per year) vs. superKEKB (full)

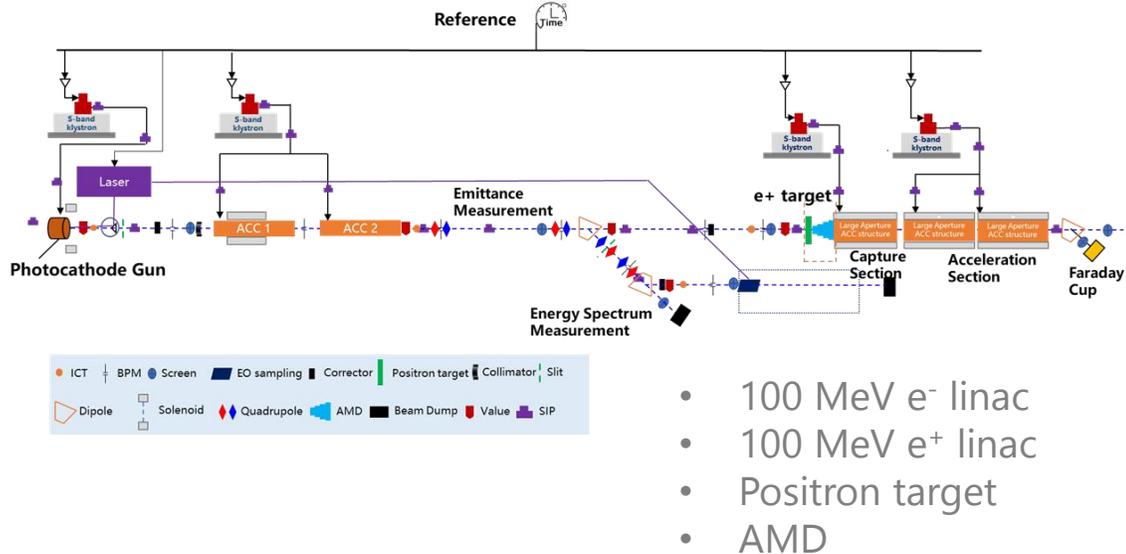


- ~ **1 ab⁻¹** at STCF per year
- STCF shows superior **statistics and purity** compare to other experiments

CME (GeV)	Lumi (ab ⁻¹)	Samples	σ(nb)	No. of Events	Remarks
3.097	1	J/ψ	3400	3.4 × 10 ¹²	
3.670	1	τ ⁺ τ ⁻	2.4	2.4 × 10 ⁹	
3.686	1	ψ(3686)	640	6.4 × 10 ¹¹	
		τ ⁺ τ ⁻	2.5	2.5 × 10 ⁹	
		ψ(3686) → τ ⁺ τ ⁻		2.0 × 10 ⁹	
3.770	1	D ⁰ \bar{D}^0	3.6	3.6 × 10 ⁹	
		D ⁺ \bar{D}^-	2.8	2.8 × 10 ⁹	Single tag
		D ⁰ \bar{D}^0		7.9 × 10 ⁸	Single tag
		D ⁺ \bar{D}^-		5.5 × 10 ⁸	
4.009	1	τ ⁺ τ ⁻	2.9	2.9 × 10 ⁹	
		D ⁰ \bar{D}^0 + c.c.	4.0	1.4 × 10 ⁹	CP _{D⁰\bar{D}^0} = +
		D ⁰ \bar{D}^0 + c.c.	4.0	2.6 × 10 ⁹	CP _{D⁰\bar{D}^0} = -
		D _s ⁺ \bar{D}_s^-	0.20	2.0 × 10 ⁸	
		τ ⁺ τ ⁻	3.5	3.5 × 10 ⁹	
4.180	1	D _s ⁺ \bar{D}_s^- + c.c.	0.90	9.0 × 10 ⁸	
		D _s ⁺ \bar{D}_s^- + c.c.		1.3 × 10 ⁸	Single tag
		τ ⁺ τ ⁻	3.6	3.6 × 10 ⁹	
4.230	1	J/ψπ ⁺ π ⁻	0.085	8.5 × 10 ⁷	
		τ ⁺ τ ⁻	3.6	3.6 × 10 ⁹	
4.360	1	γX(3872)			
		ψ(3686)π ⁺ π ⁻	0.058	5.8 × 10 ⁷	
4.420	1	τ ⁺ τ ⁻	3.5	3.5 × 10 ⁹	
		ψ(3686)π ⁺ π ⁻	0.040	4.0 × 10 ⁷	
4.630	1	τ ⁺ τ ⁻	3.5	3.5 × 10 ⁹	
		ψ(3686)π ⁺ π ⁻	0.033	3.3 × 10 ⁷	
		Λ _c $\bar{\Lambda}_c$	0.56	5.6 × 10 ⁸	
		Λ _c $\bar{\Lambda}_c$		6.4 × 10 ⁷	Single tag
τ ⁺ τ ⁻	3.4	3.4 × 10 ⁹			
4.0–7.0	3	300-point scan with 10 MeV steps, 1 fb ⁻¹ /point			
> 5	2–7	Several ab ⁻¹ of high-energy data, details dependent on scan results			

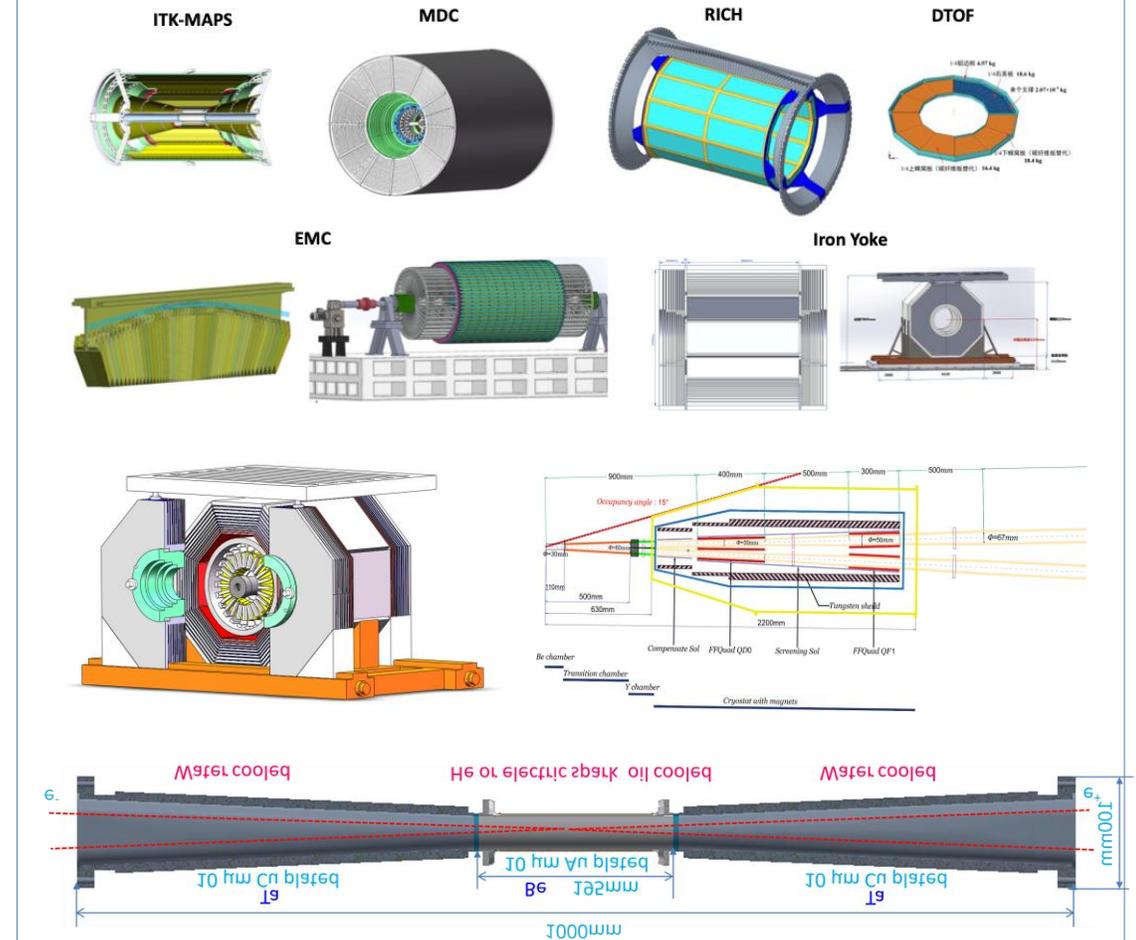
Construction Preparations

e⁻/e⁺ Beam Test Platform



- Photocathode e-gun, high-power solid-state modulator, positron target, adiabatic matching device (AMD), large-aperture S-band accel. tube, beam diagnostics
- Installation and test: mid-2026

Detector Mechanical Design



Opportunities: Beyond CDR Can Cover

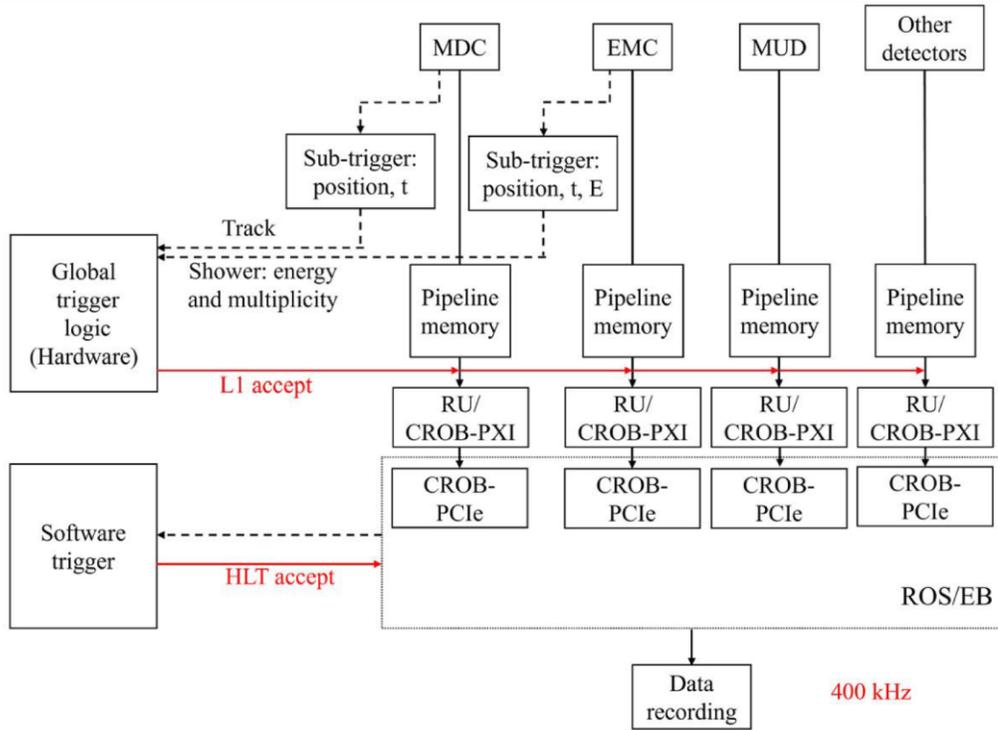


Key words / main topics of STCF
physics CDR citations

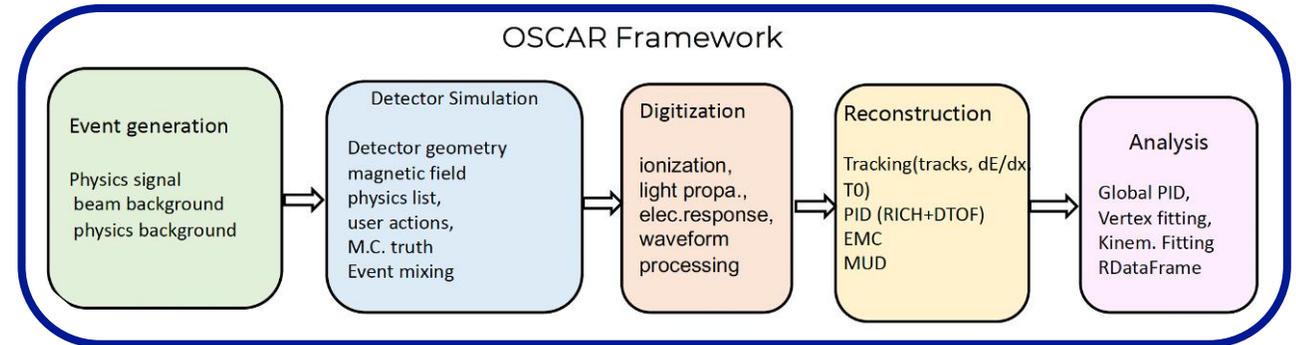


- CP in charmed baryon
- Near-threshold resonance
- EMFFs
- Triangle singularity
- Tau EDM
- D_s^* radiative decay
- Hyperon-Nucleus Scattering
- FCNC
- Light-cone distribution amplitudes
- Millicharged particles
- K0-K0bar
- Neutral meson mixing
- Spin 3/2 polarization
- QCD sum rules
- Muon g-2 and $\alpha(M_Z^2)$
- $\Lambda - \bar{\Lambda}$ oscillation
- Axion-like particle
- cLFV
- Fully charm tetraquarks
- $SU(2)_L$ -singlet vector-like fermion partners
- $\Delta S = 2$ Nonleptonic hyperon decay
- Hyperon EDM
- X(4014)
- Proton charge radius
- Coupled-channel effect
- $a_0(1710)$
- Invisible decay of J/psi

M. Achasov, et al., STCF conceptual design report (Volume 1):
Physics & detector, Front. Phys. 19(1), 14701 (2024)



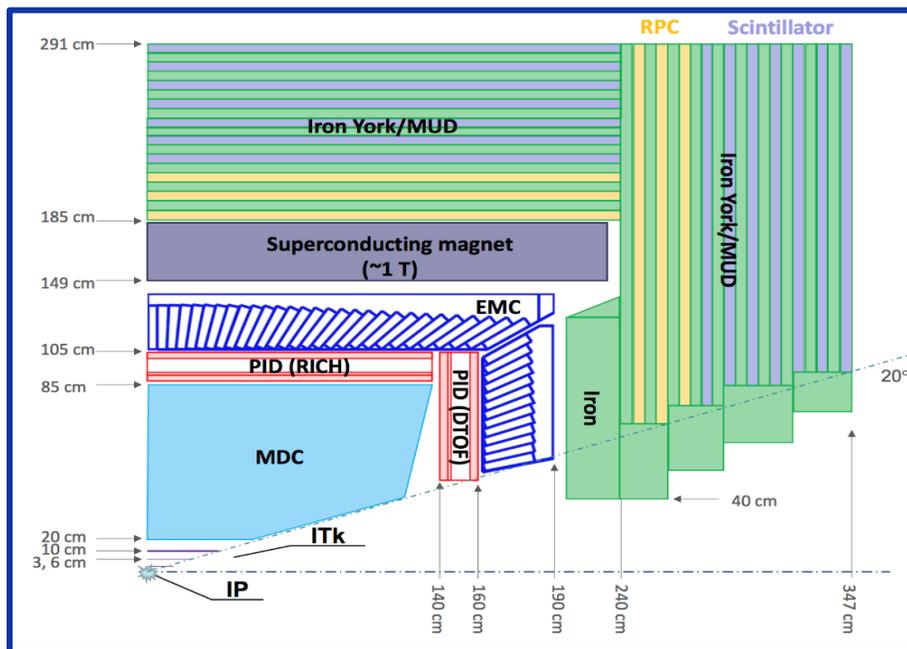
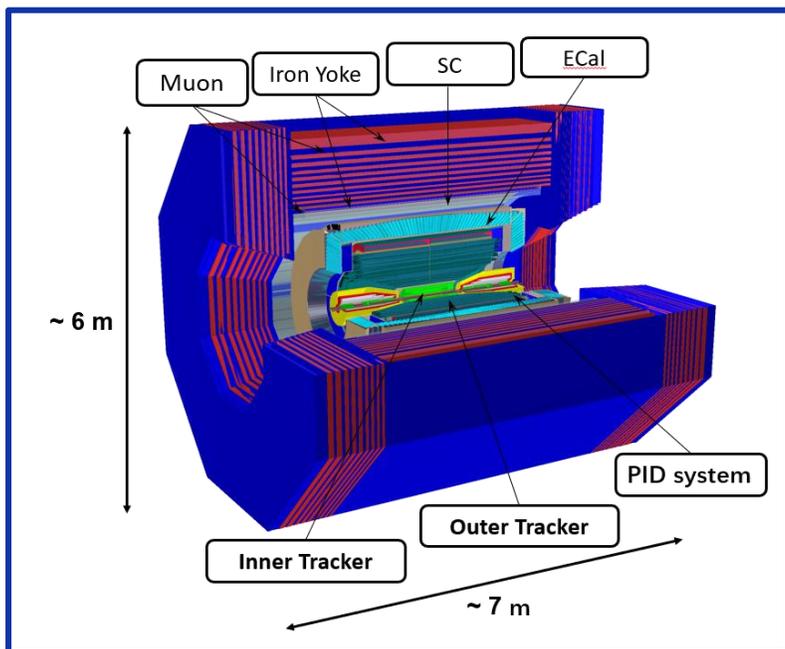
- STCF experiment core software: OSCAR
- Developed using the light-weight and flexible SNIPEr framework and adopted some state-of-the-art technologies
- Full chain of STCF detector data processing is established



Schematic STCF trigger systems

- Peak Lumi: event rate ~ 400 kHz, Raw data bandwidth > 200 GB/s
- Hardware trigger + software trigger
- Triggered data bandwidth ~ 30 GB/s

STCF detector



ITK

- $<0.3\% X_0/\text{layer}$
- $\sigma_{xy} < 100\mu\text{m}$

MDC

- $\sigma_{xy} < 130\mu\text{m}$
- $\sigma_p/p \sim 0.5\%$ @ 1 GeV
- $dE/dx \sim 6\%$

EMC (pure CsI + APD)

- E range : 0.025~3.5 GeV
- σ_E (%) @ 1 GeV
 - Barrel 2.5
 - Endcap 4.0
- Pos. res. : 5 mm

PID

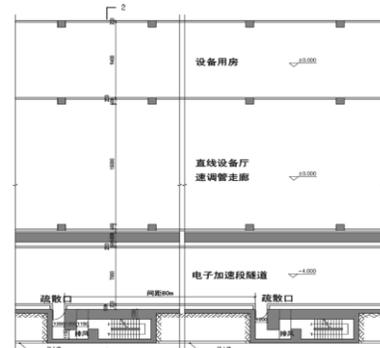
- Barrel: RICH with CsI-MPGD
Endcaps: DIRC-like TOF(DTOF)
- π/K (K/p) 3~4 σ sepa. up to 2 GeV/c
- MUD (RPC + scintillator strip)
- 0.4 ~ 2.0 GeV
 - π suppression > 30

Others :

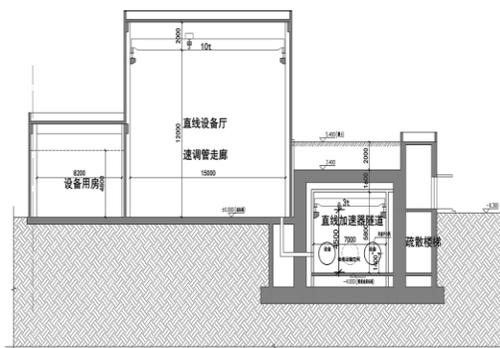
- Solid angle coverage: 94%·4 π
- Radiative hardness at the most inner layer : ~3.5kGy/y, ~2×10¹¹ 1MeV n-eq/cm²/y, ~1 MHz/cm²
- Event rate: 400 KHz @ J/ ψ



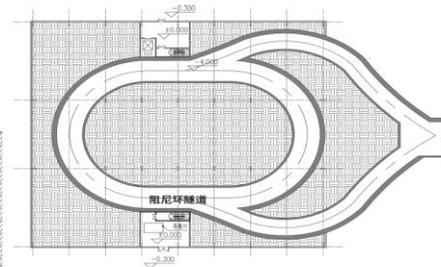
Layout of main facility



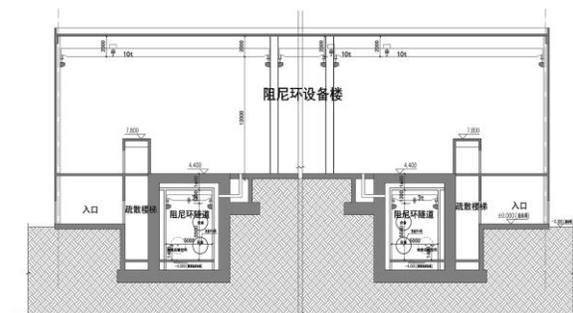
注入器直线加速段平面示意图



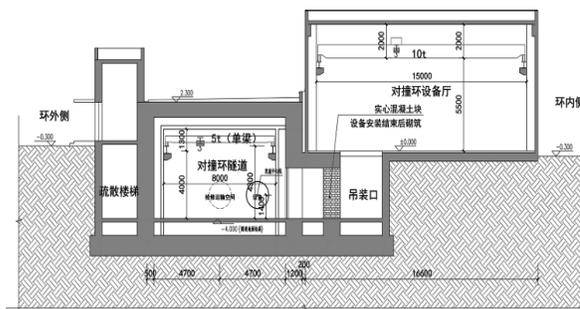
注入器直线加速段剖面图



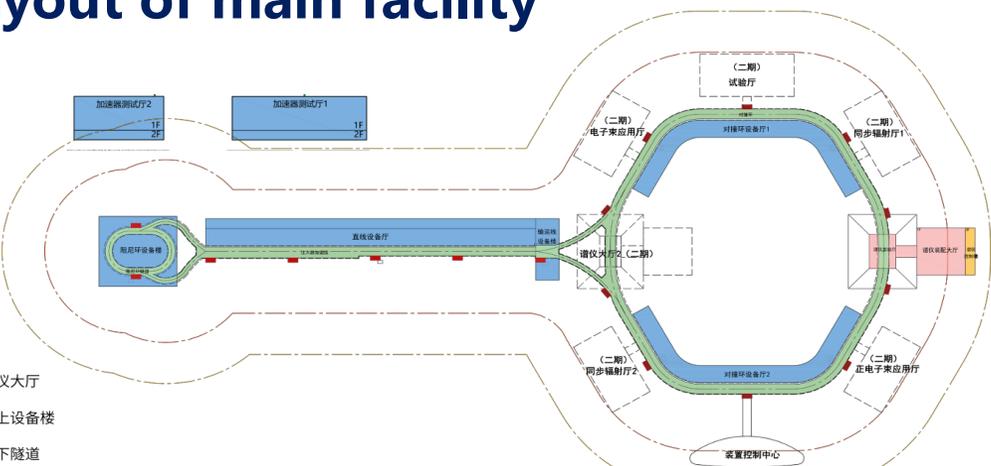
阻尼环及设备楼首层平面图



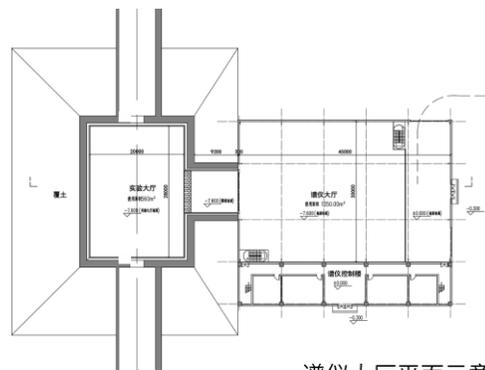
阻尼环及设备楼剖面图



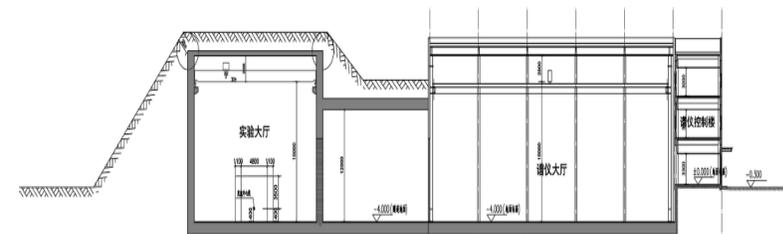
对撞环隧道 1-1剖面



- 谱仪大厅
- 地上设备楼
- 地下隧道
- 疏散楼梯
- 吊装口



谱仪大厅平面示意图



谱仪大厅剖面图

Financial Support for R&D



Year	Funding Agency (Institution)	Project Type	RMB
2018-2021	USTC	Double First-Class key project	20.0 M
2021-2026	CAS	International Partnership program	5.0 M
2022-2027	MOST	National Key R&D Program of China	17.5 M
2023-2025	Anhui/Hefei/USTC	Key Technology R&D Project	364.0 M
2023-2027	NSFC	Key Group Project	14.0 M
Total			420.5 M