SCTF* Overview

* Super charm-tau factory

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Overview of the talk

1. Introduction: SCTF in the global context
2. Physics program in broad strokes
3. SCTF project
4. R&D program
5. Related projects at BINP

Introduction:
SCTF in the global context

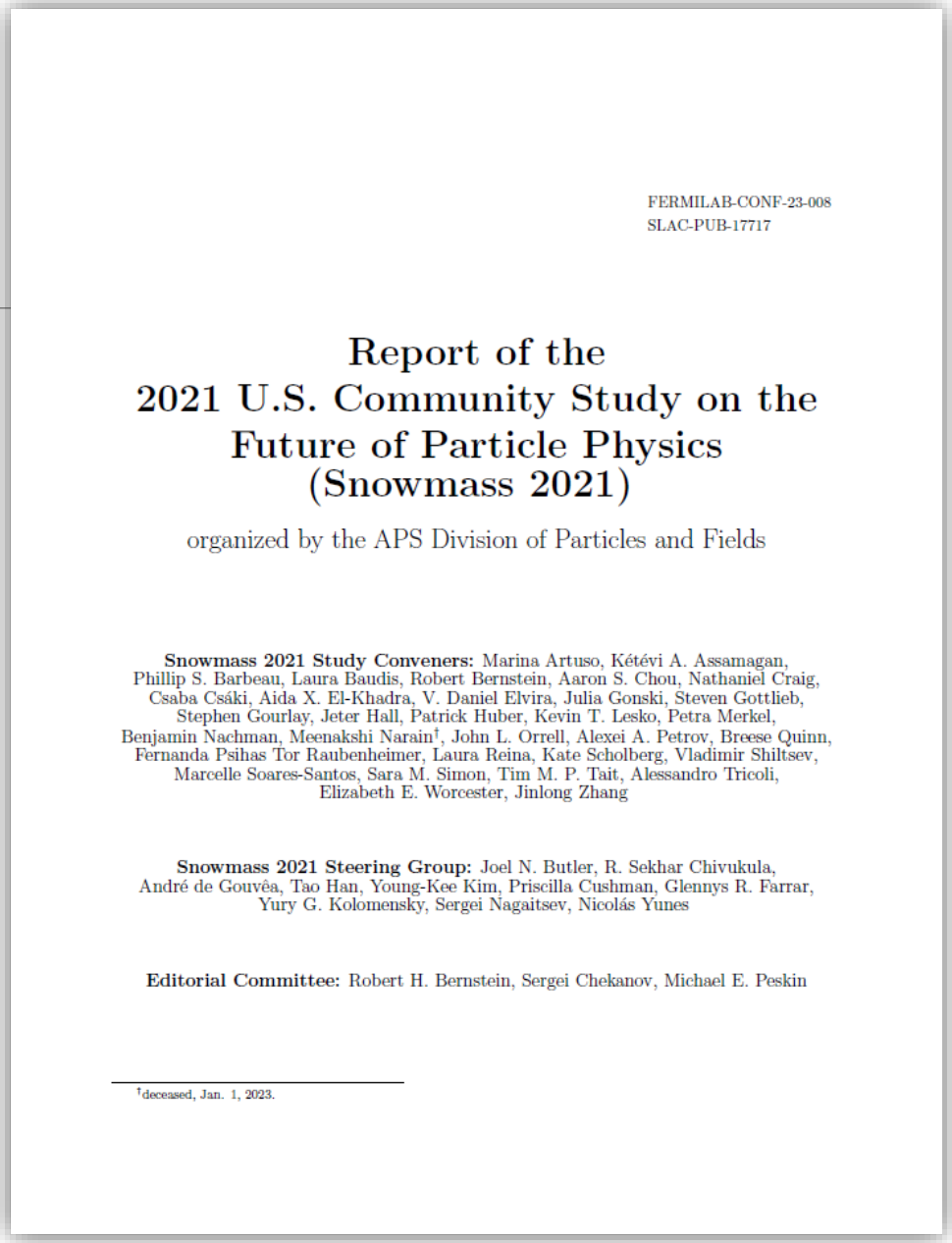
Snowmass 2021

"Snowmass" is HEP community forum for discussion of the future of the field (U.S. -> global)

HEP science drivers:

1. Use the Higgs Boson as a Tool for Discovery
2. Pursue the Physics Associated with Neutrino Mass
3. Identify the New Physics of Dark Matter
4. Understand Cosmic Acceleration: Dark Energy and Inflation
5. Explore the Unknown: New Particles, Interactions, and Physical Principles
6. Flavor physics as a tool for discovery

New



FERMILAB-CONF-23-008
SLAC-PUB-17717

Report of the
2021 U.S. Community Study on the
Future of Particle Physics
(Snowmass 2021)

organized by the APS Division of Particles and Fields

Snowmass 2021 Study Conveners: Marina Artuso, Kétévi A. Assamagan, Phillip S. Barbeau, Laura Baudis, Robert Bernstein, Aaron S. Chou, Nathaniel Craig, Csaba Csáki, Aida X. El-Khadra, V. Daniel Elvira, Julia Gonski, Steven Gottlieb, Stephen Gourlay, Jeter Hall, Patrick Huber, Kevin T. Lesko, Petra Merkel, Benjamin Nachman, Meenakshi Narain†, John L. Orrell, Alexei A. Petrov, Breese Quinn, Fernanda Psihas Tor Raubenheimer, Laura Reina, Kate Scholberg, Vladimir Shiltsev, Marcelle Soares-Santos, Sara M. Simon, Tim M. P. Tait, Alessandro Tricoli, Elizabeth E. Worcester, Jinlong Zhang

Snowmass 2021 Steering Group: Joel N. Butler, R. Sekhar Chivukula, André de Gouvêa, Tao Han, Young-Kee Kim, Priscilla Cushman, Glennys R. Farrar, Yury G. Kolomensky, Sergei Nagaitsev, Nicolás Yunes

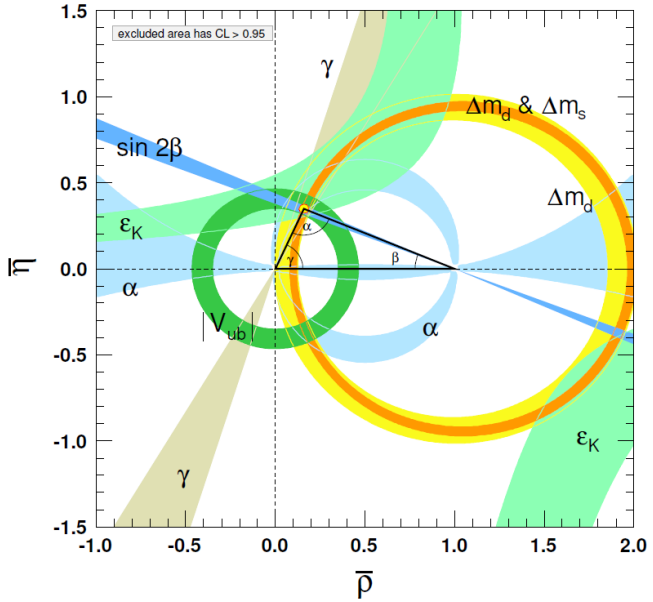
Editorial Committee: Robert H. Bernstein, Sergei Chekanov, Michael E. Peskin

†deceased, Jan. 1, 2023.

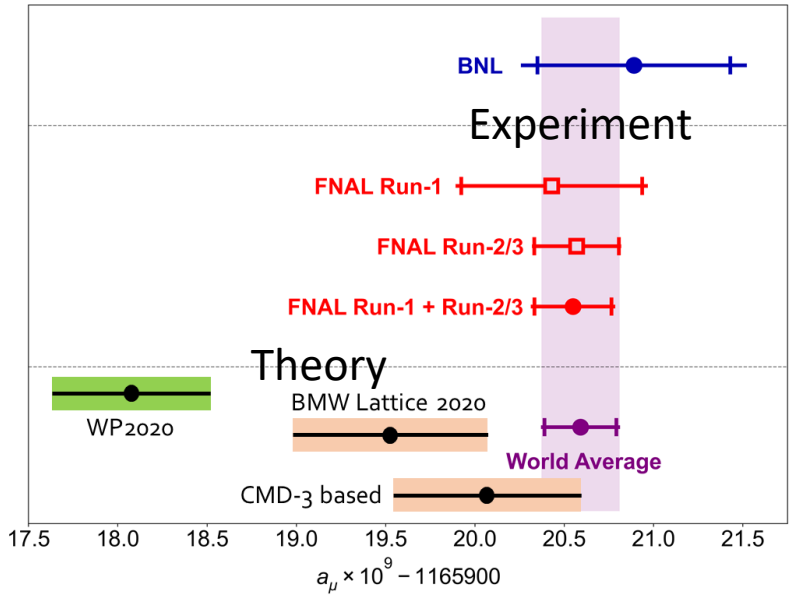
Flavor physics

Flavor physics – precise measurement of properties of (heavy) leptons and quarks (CP violation, rare decays, CLFV, magnetic moments,…) – one of key directions for understanding SM and searched beyond SM.

Unitarity triangle



Anomalous magnetic moment of muon



Precision is everything: The higher precision, the higher equivalent energies are reached

Colliders-Factories

Energy ranges of high luminosity colliders (factories) correspond to production thresholds of known particles.

cτ-factories

BEPC-II (China)

x100 gain in luminosity

Super $c\tau$ factory

SCTF (Russia), STCF (China)

B-factories

PEP-II (USA), KEK-B (Japan)

Super KEK-B (Japan)

LHCb (CERN)

Z- and H-factories

LEP, LEP-2 (CERN)

FCC-ee (CERN)

CEPC (China)

Ultimate performance (precision) is determined by luminosity and detector quality

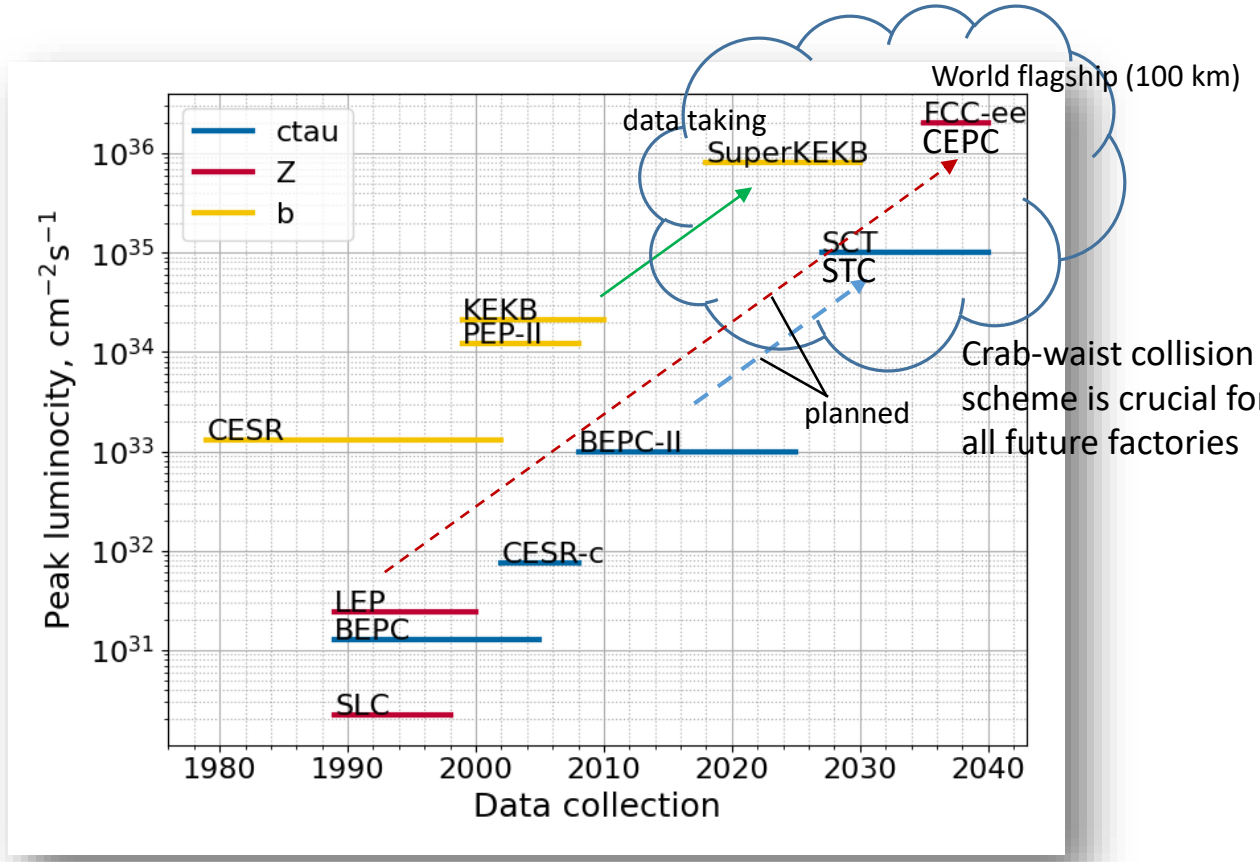
Generations of factories

Today:		Tomorrow:
LHCb: 5 fb^{-1}	x10-60 →	LHCb: 50/300 fb^{-1} (Run 3/4)
B-factories: 1 ab^{-1}	x50 →	Super KEK-B: 50 ab^{-1}
BES-III: ~100 fb^{-1}	x100 →	Super c-tau factory: ~10 ab^{-1}

- There is delicate balance between existing $c\tau$-factory and B-factories (BES-III, BABAR, BELLE, LHCb)
- Need to keep the same balance for the next generation of colliders

Super $c\tau$-factory is the natural element of global HEP strategy

Super factories today and tomorrow

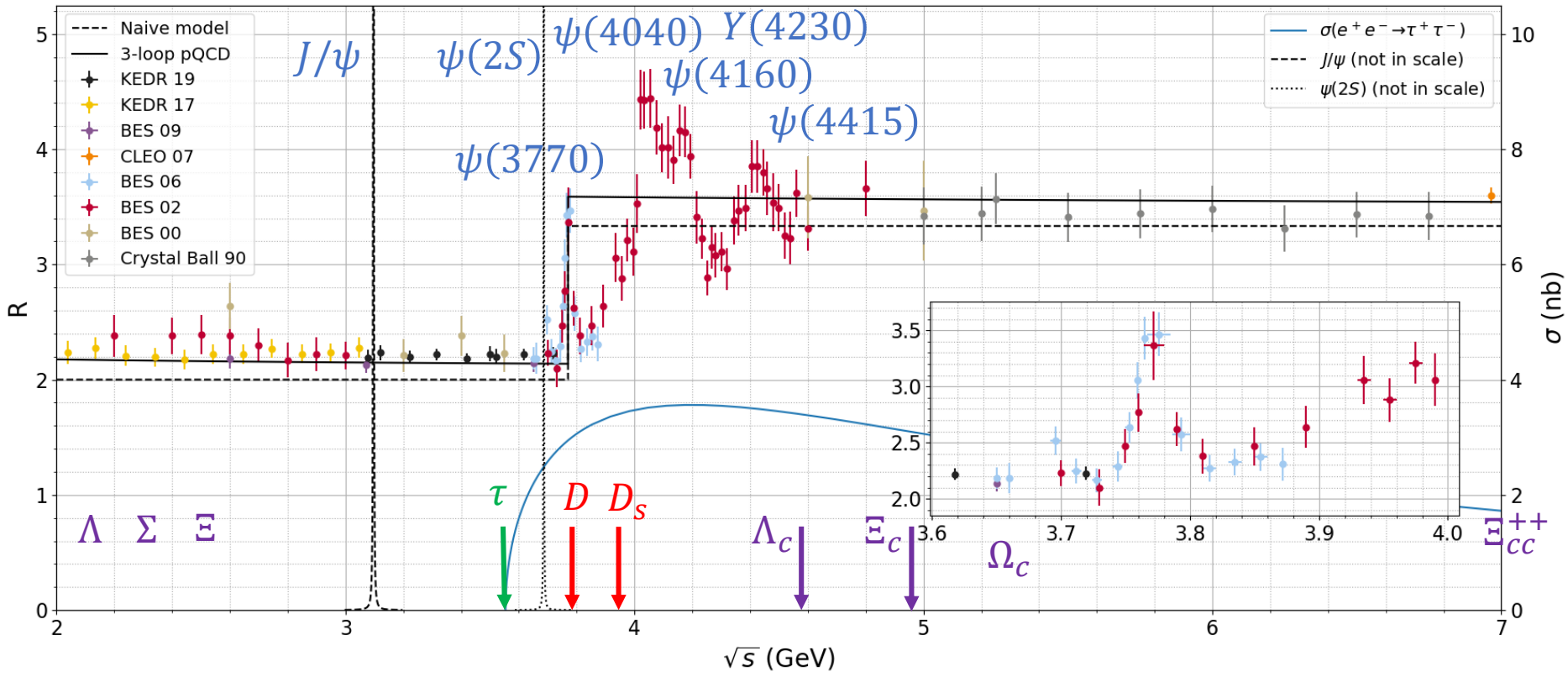


Crab-waist collision scheme is crucial for all future factories

Physics program in broad strokes

Energy range of SCTF

$$R \equiv \frac{\sigma(e^+e^- \to \text{hadrons})}{\sigma_0(e^+e^- \to \mu^+\mu^-)}$$



$\mathcal{L} = 10^{35}\ \text{cm}^{-2}s^{-1}$

A one-year dataset

$2E$, GeV	Events recorded
3.1	$10^{12}\ J/\psi$
3.69	$10^{11}\ \psi(2S)$
3.77	$10^{9}\ D\bar{D}$
4.17	$10^{8}\ D_s\bar{D}_s$
$3.55 \div 4.3$	$10^{10}\ \tau\,\tau$
4.65	$10^{8}\ \Lambda_c^+\Lambda_c^-$

Threshold kinematics!

Key directions of the physics program

- ✓ Measurement of the strong phases of D decay amplitudes
- ✓ Measurement of absolute branching fractions
- ✓ Searches for rare and forbidden decays of the charm quark
- ✓ CP violation in charm
- ✓ …

Input for B meson studies at LHCb and Belle II

charm

QCD

- ✓ Physics of highly-excited quarkonium
- ✓ Molecular states (XYZ)
- ✓ Baryon interaction at threshold
- ✓ Search for glueballs in decays of J/ψ and $\psi(2S)$
- ✓ Searches for rare and forbidden decays of J/ψ
- ✓ Measurement of $\sin^2\Theta_W$ at J/ψ
- ✓ …

Test of the electroweak sector of the SM

- ✓ Precision measurement of the τ lepton properties
- ✓ Michel parameters, tests of lepton universality
- ✓ Precision measurement of hadronic τ decays
- ✓ Search for CP and T violation in τ decays
- ✓ Searches for rare and forbidden decays of τ

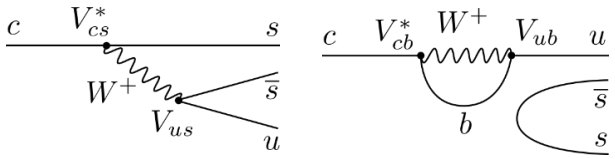
tau

QCD, α_s, V_{us}. Test of the electroweak model, searches for non-standard contributions

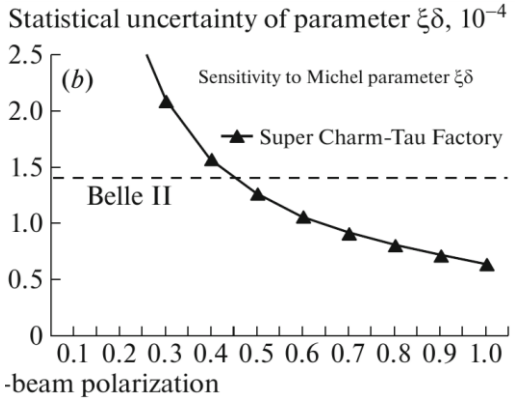
Test of the electroweak sector of the SM

Some key results expected from SCTF

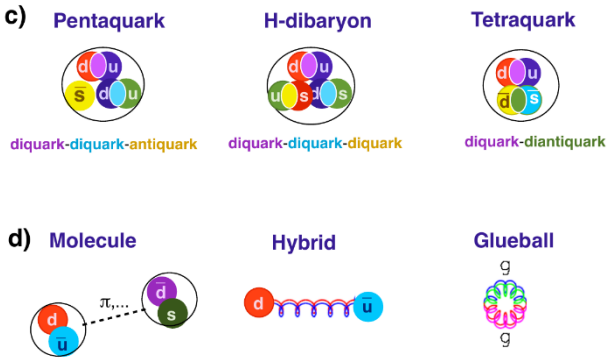
Systematic study of CP-violation in decays of D-mesons



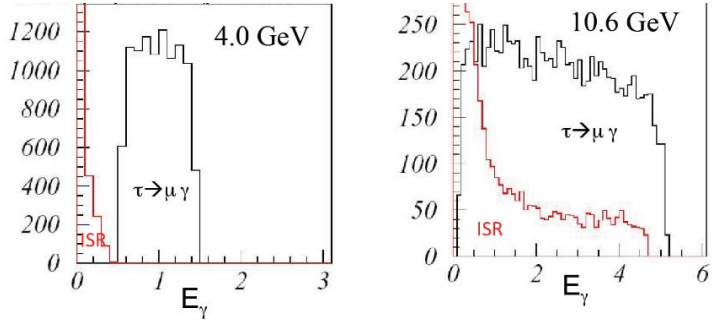
Lorentz-structure of weak currents in $\tau \to l\bar{\nu}\nu$



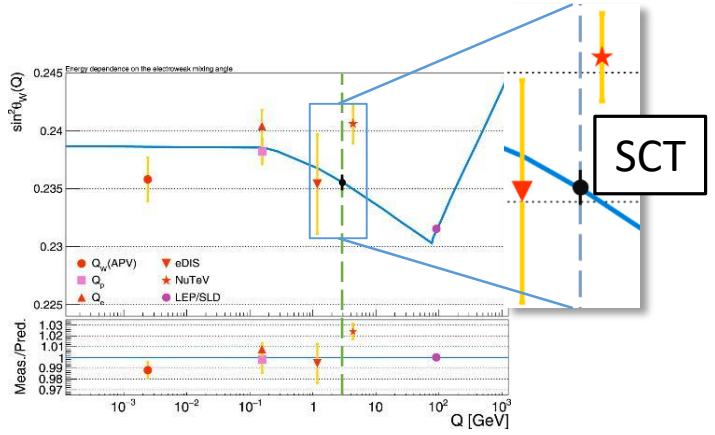
XYZ physics



Search of LFV decay $\tau \to \mu\gamma$



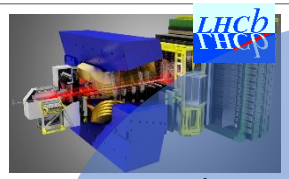
Measurement of $\sin^2\Theta_W$ at J/ψ energy

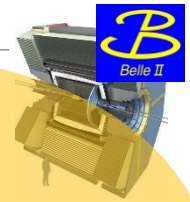


Super $c\tau$ factory and B factories

The experiments at Super charm-tau factory are complement to experiments at Super KEK-B and LHCb, with unique possibilities:

- Threshold production of particles
- Pair production
- Quantum correlations in $D^0\overline{D}^0$ production
- Low multiplicity, full reconstruction of decay chain
- Polarization of electron beam





$B^0 \to D^0\pi^+\pi^-$ $B^+ \to h_1^+h_2^+h_3^-$ Only charged particles in the final state

B_s Λ_b Ω_b Σ_b CKM γ

$D^0 \to e\mu$ B^0 mixing and lifetime

CPV in $D^0 \to h^+h^-$

$B_s^0 \to \mu\mu$ B_s^0 mixing and lifetime φ_s

$B^0 \to \mu\mu$ $\tau \to \mu\mu\mu$ $D^0 \to \mu\mu$

$B \to K^*ll$ $B \to D^*\tau\nu$

$b \to s/d\gamma$ $b \to ulv$ CKM α, β V_{ub} V_{cb} $B \to D^0\tau\nu$ τ lifetime

$B \to K_s^0\pi^0\gamma$ $\Upsilon(6S)$ $B \to K_s^0K_s^0K_s^0$ $\Upsilon(5S)$

$B \to K^+\pi^-\pi^0$ Z_b $B \to h\nu\nu, \tau\nu$

Charm spectroscopy $X(3872) \to J/\psi\pi\pi$ α_s $D \to l\nu$

Charm mixing $\tau \to$ hadrons

$D \to$ invisible $\tau \to \mu\gamma$ $\sin\theta_W$ Neutral particles in the final state $\tau \to l\nu\nu$

Model-independent $D^0 \to K_S^0\pi^+\pi^-$ $Z_c(3900) \to J/\psi\pi$

Quantum correlated $D^0\overline{D}^0$ Absolute branching fractions

CPV in charm $\delta_{K\pi}$ V_{cd} Polarized beam

$J/\psi(c\bar{c}) \to W^+s$ $J/\psi \to$ hadrons

SUSY, Charged Higgs

Clear BSM

Clear BSM

Dark matter

New CPV

Charged Higgs

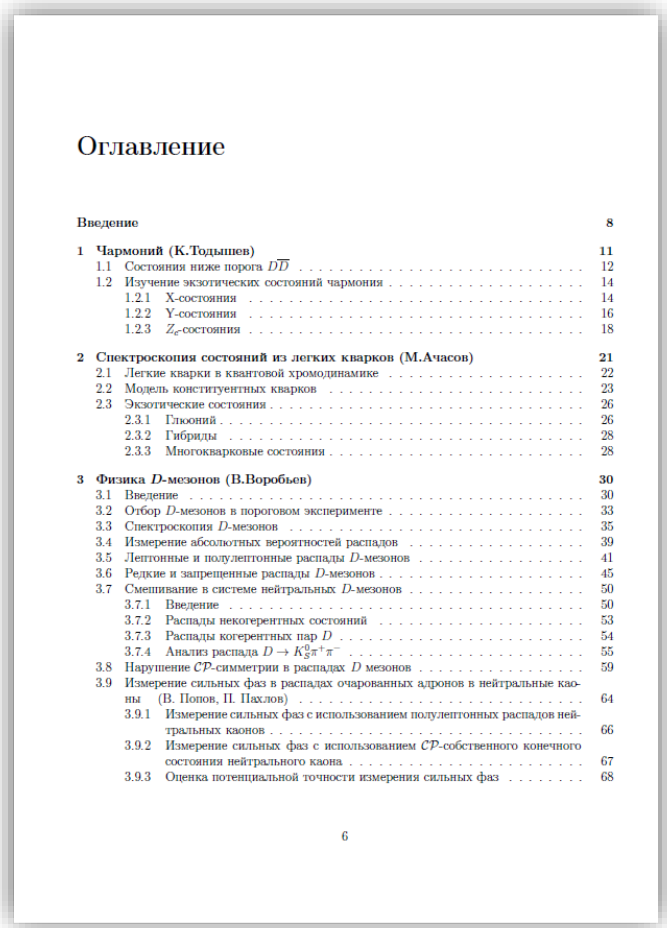
Charged Higgs

LFU

LFU

SCT

Physics program: 2022 revision (in Russian)



Оглавление

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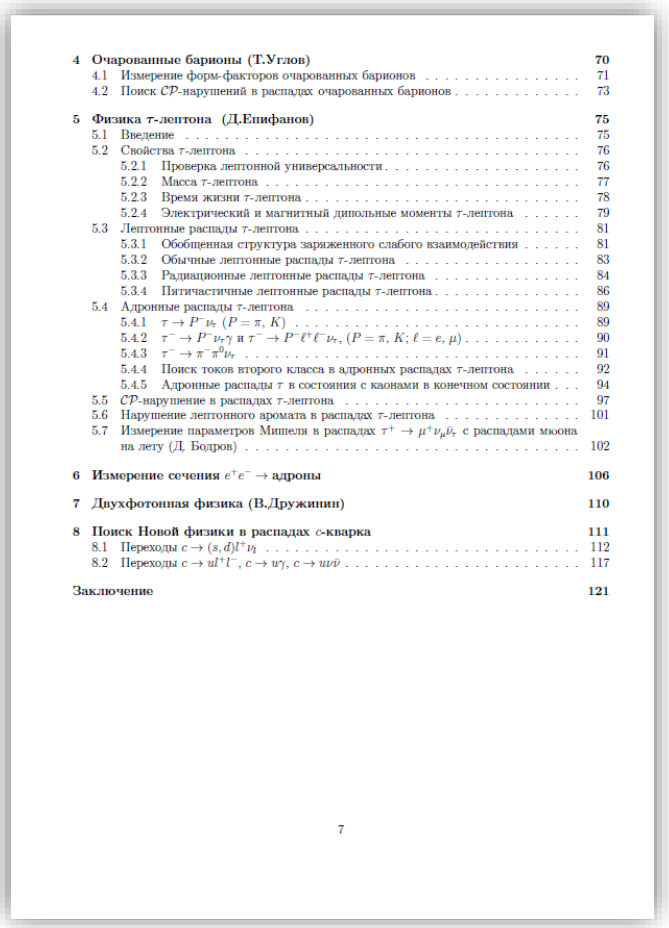

7

- 2021: ≈ 40 pages
- 2022: ≈ 120 pages
- Editors:
  - G.Pakhlova (LPI)
  - A.Bondar (BINP)

Available at [ctd.inp.nsk.su](ctd.inp.nsk.su)

Shorter (extracted) version prepared as a white paper for Snowmass

Physics program: UFN paper (2024)

Experiments at the Super Charm-Tau factory

M.N. Achasov [1,2], **V.E. Blinov** [1,2], **A.V. Bobrov** [1,2], **D.A. Bodrov** [3], **A.E. Bondar'** [1,2], **V.S. Vorobiev** [1], **D.S. Gorbunov** [4], **V.P. Druzhinin** [1,2], **D.A. Epifanov** [1,2], **A.S. Kuzmin** [1,2], **I.B. Logashenko** [1,2], **D.V. Matvienko** [1,2], **A.V. Nefediev** [5], **P.N. Pakhlov** [3,5], **G.V. Pakhlova** [5], **V.E. Popov** [6], **T.V. Uglov** [5,*]

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E-mail: [*] *timofey.uglov@gmail.com*

The review discusses the physical program of a new experiment at the Super Charm-Tau factory, the basis of which will be a powerful electron-positron collider with a luminosity of $\sim 10^{35}$ cm^{-2} s^{-1} and an energy in the center of mass system in the range from 3 to 5 GeV. A modern detector located around the beam collision point will provide a new level of measurement accuracy. The longitudinal polarization of the electron beam, along with record luminosity, will allow the unique experiment to successfully compete with the existing Super B-factories Belle II and LHC*b*. The extensive physical program includes the study of the properties and measurement of physical parameters of charmed hadrons, the τ-lepton, the charmonium, and exotic states, as well as the study of the production of light hadrons in e^+e^--annihilation and in two-photon processes. In addition to testing the Standard Model and precisely measuring its parameters, a comprehensive search for New Physics beyond its boundaries is planned.

Keywords: e^+e^--collider, polarized beams, quantum chromodynamics, τ-lepton, physics of charmed hadrons, New Physics

PACS numbers: **12.38.–t, 12.60.–i,** 29.20.db

Bibliography — 199 references
Uspekhi Fizicheskikh Nauk **194** (1) 60–76 (2024)
DOI: https://doi.org/10.3367/UFNr.2023.10.039583

Received 11 April 2023, revised 22 October 2023
Physics–Uspekhi **67** (1) (2024)
DOI: https://doi.org/10.3367/UFNe.2023.10.039583

A review of the SCTF physics program has just been published in the Russian top physics journal "Physics-Uspekhi."

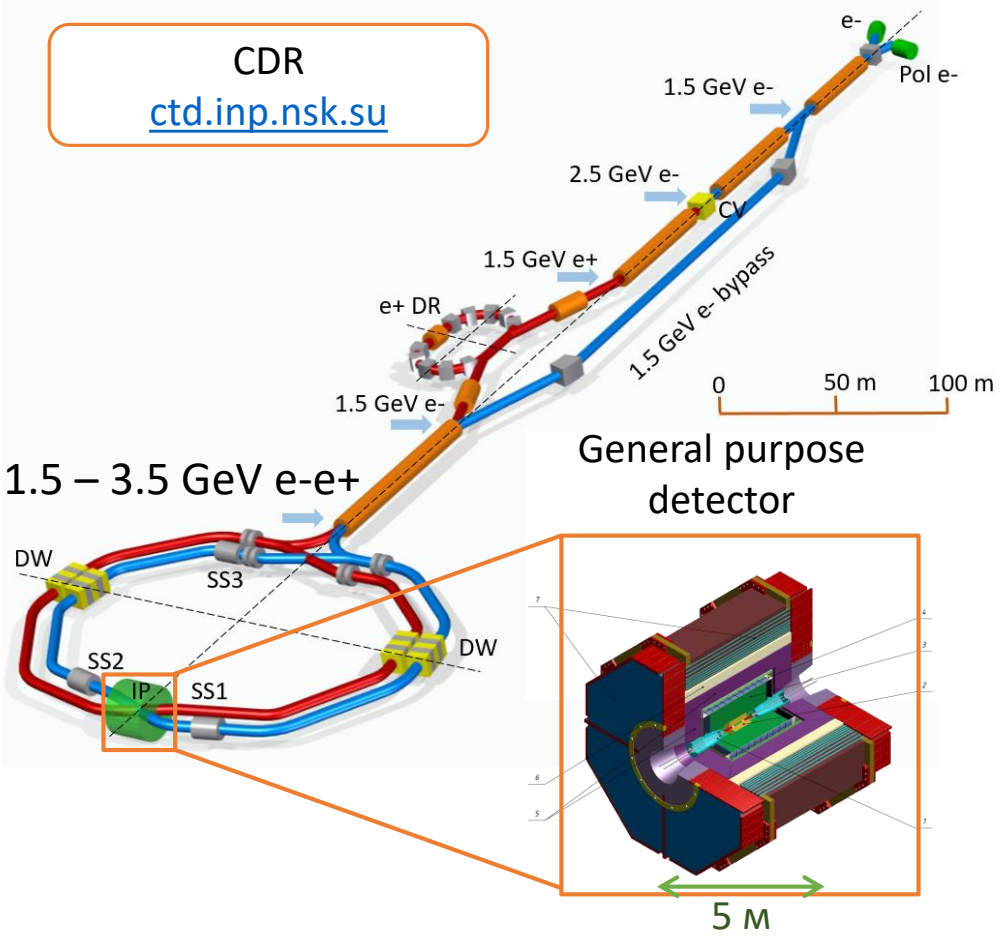
Feasibility studies with realistic detectors and background descriptions are crucial to the further development of a physics program.

https://doi.org/10.3367/UFNe.2023.10.039583

SCTF project

Super charm-tau factory

- Super charm-tau factory is e^+e^- collider, dedicated to precision study of properties of charm-quark, tau-lepton, study of strong interactions, search of BSM physics
  - Beam energy from 1.5 to 3.5 GeV
  - Luminosity $\mathcal{L} = 10^{35}\ cm^{-2}\mathrm{c}^{-1}$ @ 2.5 GeV
  - Longitudinally polarized electron beam
- Experiments will be conducted using state-of-the-art general purpose detector
  - Tracking (including low p_t)
  - Calorimetry (high resolution, fast, π^0/γ sep.)
  - Particle ID ($\mu/\pi/K/p$ up to 1.5 GeV/c)



Detector at SCTF

Momentum resolution $\sigma_p/p \leq 0.4\%$ at 1 GeV

Very symmetric and hermetic

Able to detect soft tracks ($p_t \geq 50\ MeV/c$)
- Inner tracker should be able to handle 10^4 tracks/cm^{2}s

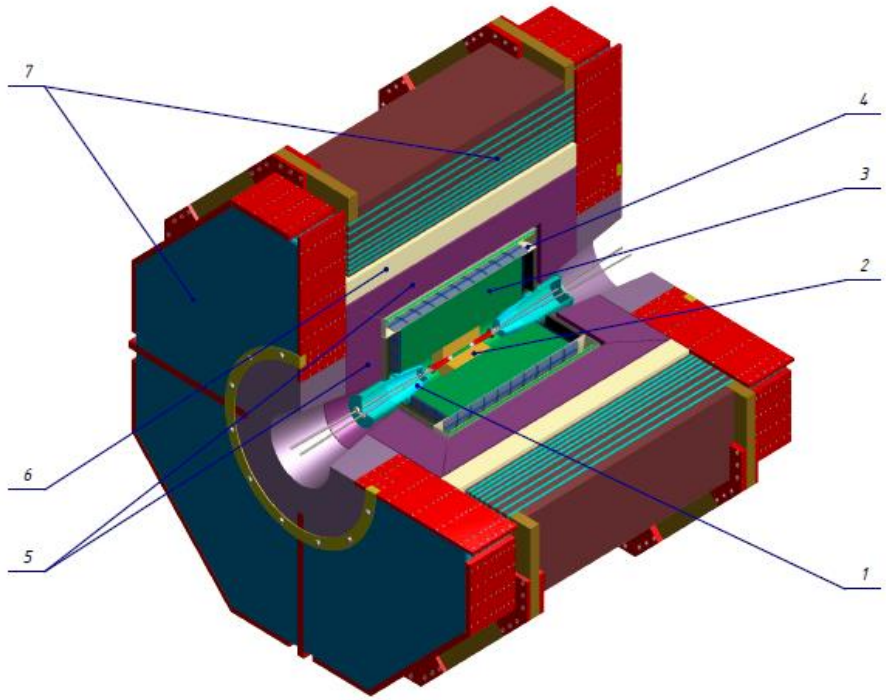
Very good particle identification: $e/\mu/\pi/K$
- π/K in the whole energy range, e.g. for $D\bar{D}$ mixing
- μ/π up to 1.5 GeV, e.g. for $\tau \to \mu\gamma$ search
- dE/dx better than 7%

Able to detect γ from 10 MeV to 3 GeV, good π^0/γ separation
- Calorimeter energy resolution $\sigma_E/E \leq 1.8\%$ at 1 GeV
- Calorimeter time resolution $\sigma_t \leq 1$ ns

Efficient “soft” trigger

Ability to operate at high luminosity, up to 300 kHz at J/ψ

1. Vacuum pipe
2. Inner tracker
3. Drift chamber
4. PID
5. Calorimeter
6. SC magnet
7. Muon system



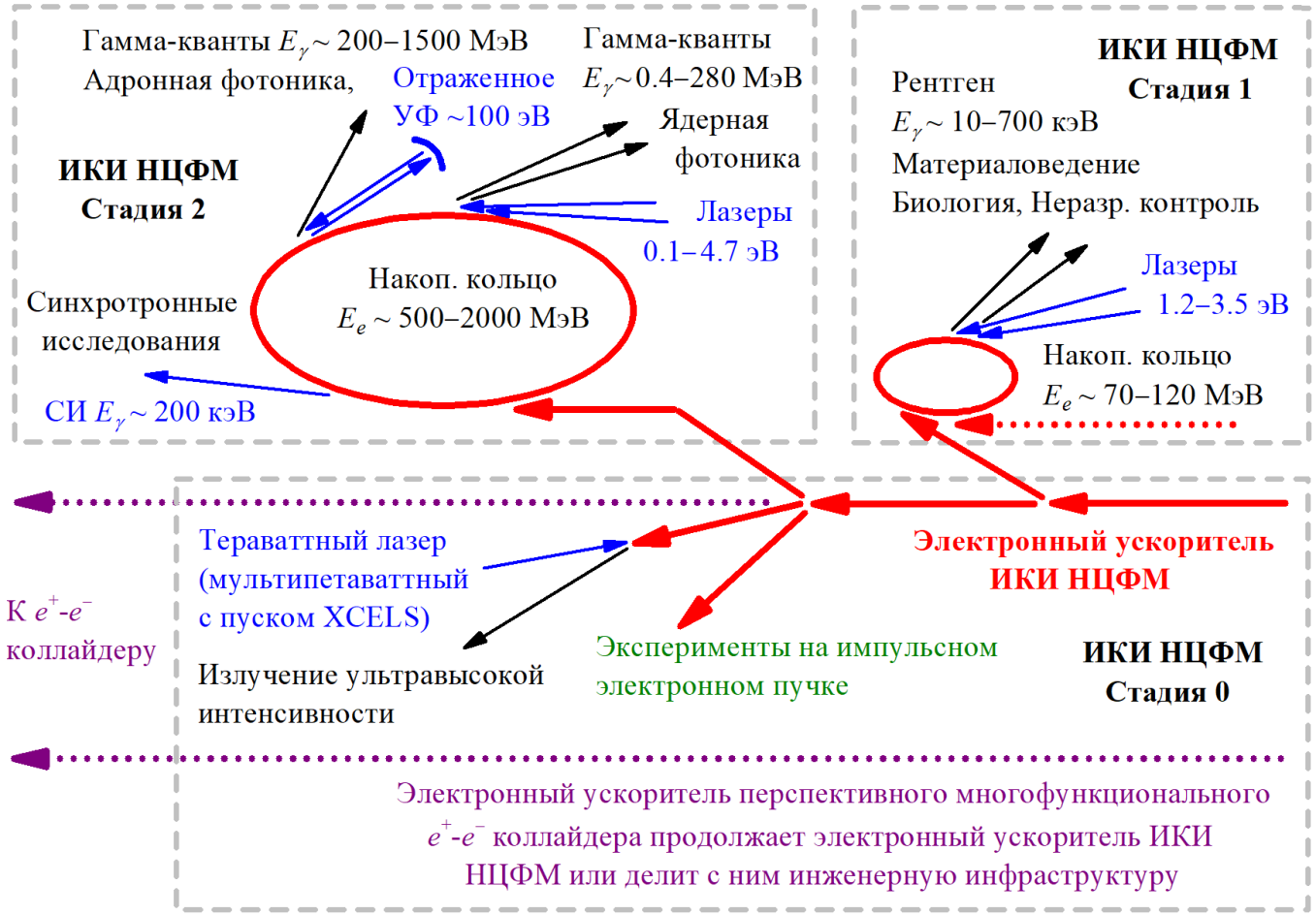
5.6 x 5.6 x 5.3 m^3

Potential location: NCPM, Sarov

- National Center of Physics and Matematics is a new scientific/university center (established in 2021), located near Sarov, the largest nuclear center in Russia.
- SCTF is discussed as one of the prospective science infrastructures for NCPM.
- The SCTF R&D program is supported as a part of NCPM scientific program (2023-2025).
- SCTF R&D program is realized by informal collaboration of Russian institutions.

Intensive Compton Gamma Source

- The priority infrastructure at NCPM is the intensive gamma source, based on the scattering of laser photons on a relativistic electron beam.
- The source includes 2 GeV linac and 1-2 storage rings, and several experimental stations
- The SCTF is considered as the next-step facility that will share electron source/linac and engineering infrastructure
- No decision/schedule yet
- R&D program is supported by NCPM for both projects



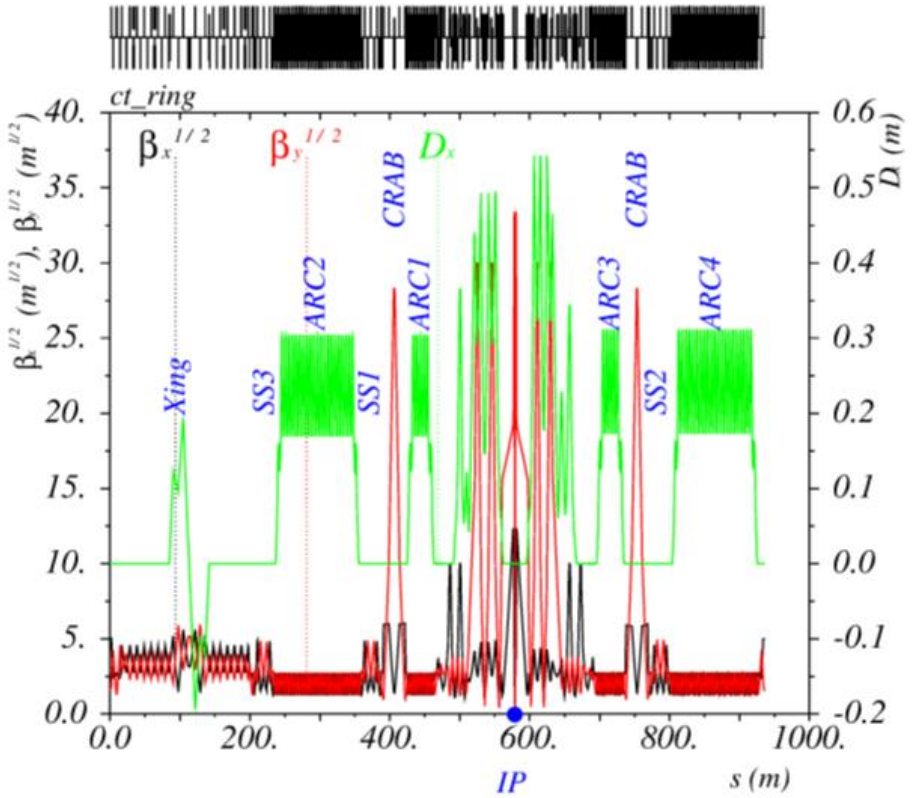
R&D program

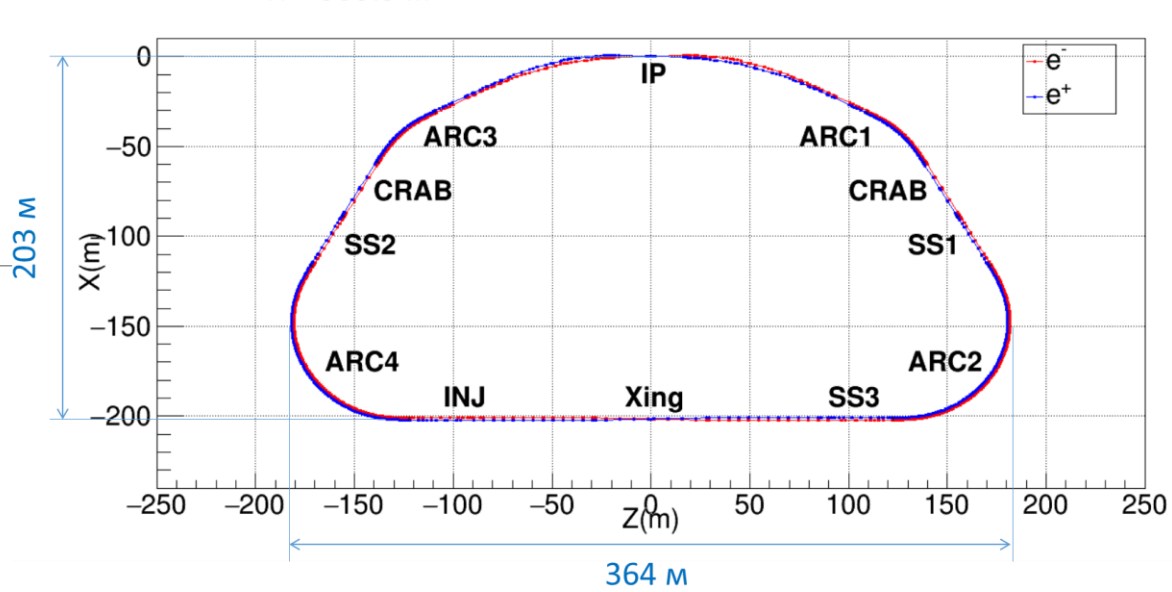
With partial support from NCPM

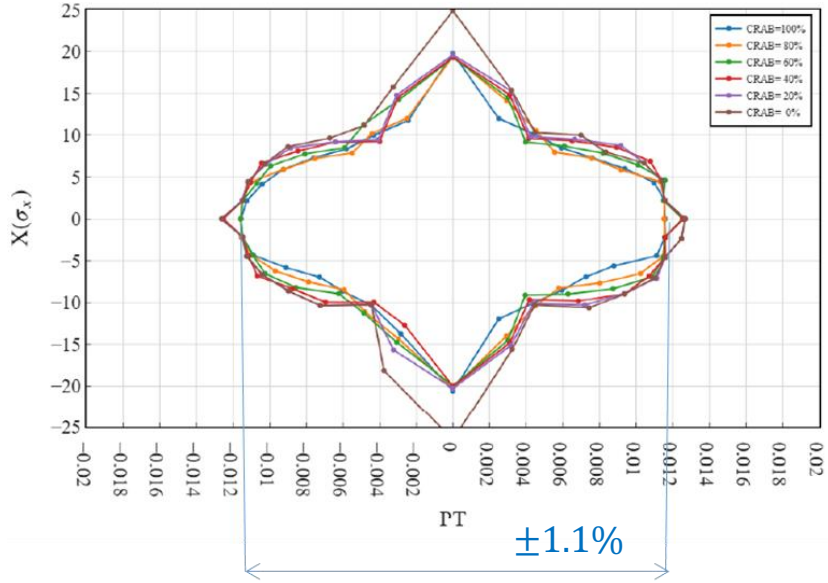
1. Collider studies
   - Simulations (design and ultimate luminosity)
   - R&D for final focus
   - R&D for electron source/linac
2. Detector studies
   - Inner tracker
   - Drift chamber
   - PID
   - Calorimeter
   - Magnet (*Talk by E.Pyata, 16/01 11:50*)
3. Simulations and feasibility studies

Collider studies

Talks by A.Bogomyagkov, 18/01 9:30; 16/01 11:50







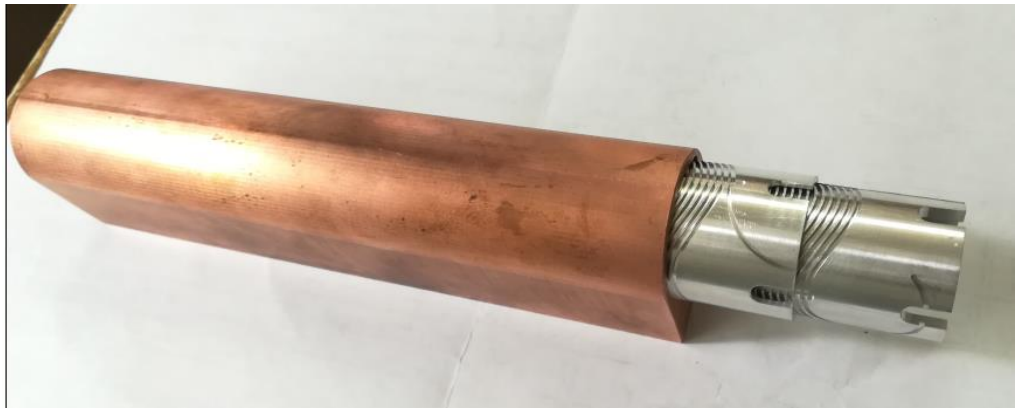
Dynamic aperture

Collider parameters

E, GeV	1.5	2.0	2.5	3.0	3.5
Π, m	935.874				
2θ, mrad	60				
β_x^*/β_y^*, cm	10/0.1				
Q_x/Q_y	30.545/29.61				
C_x/C_y	−64/−328				
$\alpha \times 10^3$	1.35				
I, A $/N_b$	2.9/941	1.64/983	2.5/983	2.7/983	2.9/974
$N_p \times 10^{-10}$	6	3.25	5	5.3	5.8
$\varepsilon_y/\varepsilon_x$ (%)	10	0.5	0.5	0.5	0.5
$\varepsilon_x(SR/IBS+WG)$, nm	2/2.9	3.5/3.5	5.5/3.2	7.9/4.1	10.7/5.7
$\sigma_e \times 10^3(SR/IBS+WG)$	0.3/0.9	0.4/1.1	0.45/1.2	0.5/1.2	0.6/1.3
σ_s, mm	17	15	14	14	14
ξ_x/ξ_y	0.003/0.03	0.002/0.06	0.002/0.08	0.002/0.065	0.002/0.053
ν_s/ξ_x	3	8	6.8	8	8
$\tau_x/\tau_y/\tau_e$, ms	102/102/51	43/43/22	31/31/15	23/23/11	17/17/9
$\mathcal{L} \times 10^{-35}$, cm^{-2}s^{-1}	0.29	0.4	1	1	1
T_t, s	304	304	302	560	1100

Limited by beams lifetime >300 s

Prototypes of the elements of final focus



Concept design of SC FF lens
Direct Double Helical (DDH) technology
2 concentric coil at 2 cylinders

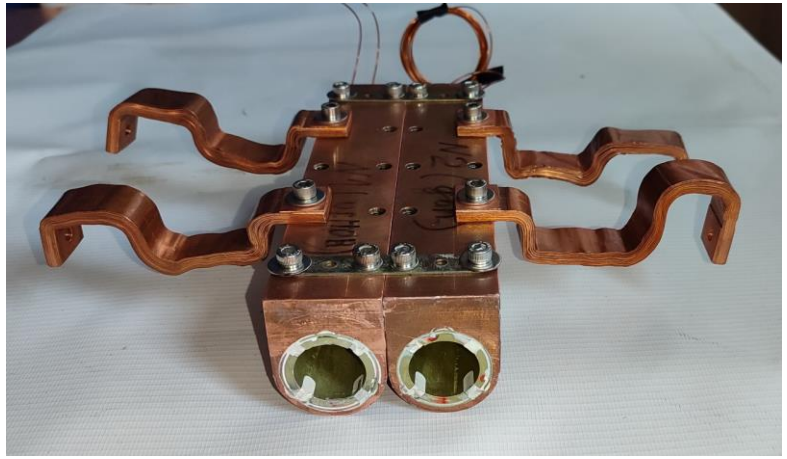
The FF design is critical to reach design luminosity

We are working on prototyping and testing the key elements of FF

FF SC quadrupole lenses were designed and built.

First tests were done, **40 T/m gradient achieved**!

A.Krasnov, Vacuum/cryo design of CW FF, 17/01 11:15
V.Shkaruba, FF SC quadrupole, 17/01 11:40



RF electron gun studies

Number of the particles in the bunch	**$2 \cdot 10^{11}$ /s**
Emittance	**10 nm**
RMS energy spread	**0.1%**

RF photogun is the main candidate as source of electrons.

We are studying the metallic photocathodes. The cathodes should have

- the sufficient quantum efficiency,
- the stress stability,
- the long lifetime.

One of such cathode is IrCe alloy.

We obtained the quantum efficacy of $\mathbf{7,69 * 10^{-5}}$.

UV laser for the metallic photocathodes

Cathode based on the IrCe alloy

Using the electrolytic and the thermal etching we are modifying the surface of the cathode to increase the effective emission area and the quantum efficiency.

Also, studies and tests of the optimal RF gun design for intense quality electron beam are carried out at the BINP at dedicated facility.

Joint R&D with Compton gamma source program

Inner tracker: TPC option

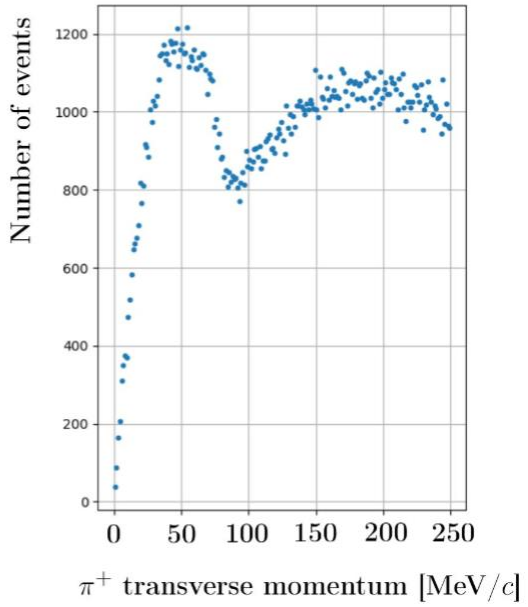
Considerations

Tasks

- Measure soft $\pi^{\pm}$ mesons momentum ($p < 100$ MeV/c)
- Complement the drift chamber in measuring the momenta
- Detect secondary vertices from the decays of short-lived particles (K_S , Λ)

Requirements

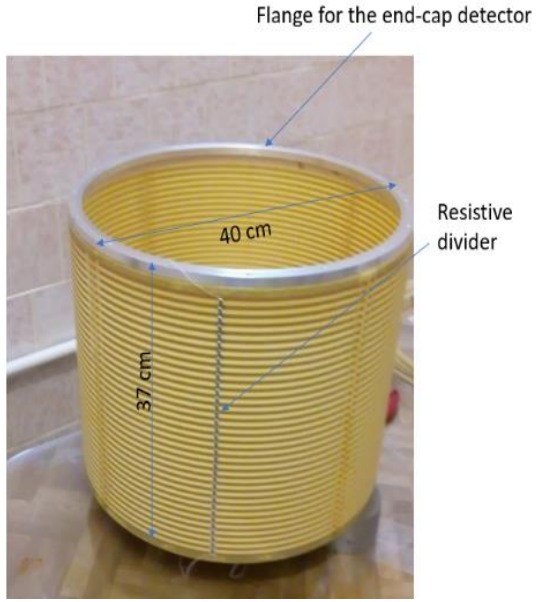
- Cover angle close to 4π
- Handle with high particle flux – luminosity of 10^{35} cm^{-2} s^{-1}
- Provide spatial resolution ~ 100 μm



Simulation of π^+ transverse momentum distribution in $e^+e^- \rightarrow DD^*$ (V. Vorobyev)

We are working on TPC option for IT

Talk by T.Maltsev, 16/01 09:00

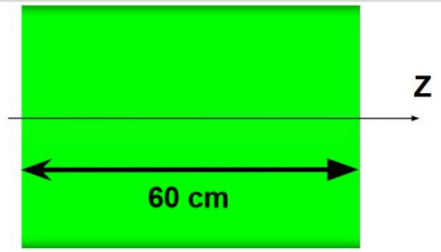


Prototype

Inner tracker: TPC option

Vacuum beampipe	
Material	Thickness
Beryllium	1 mm
Paraffin	0.5 mm
Beryllium	1 mm

Thin inner wall	
Material	Thickness
Kapton	50 μm
Teflon	100 μm
Copper	5 μm



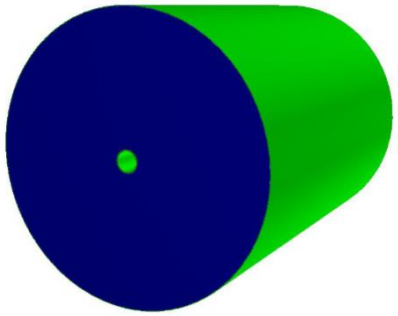
Gas volume	
Material	Thickness
Ar+20%CO_2	20 cm

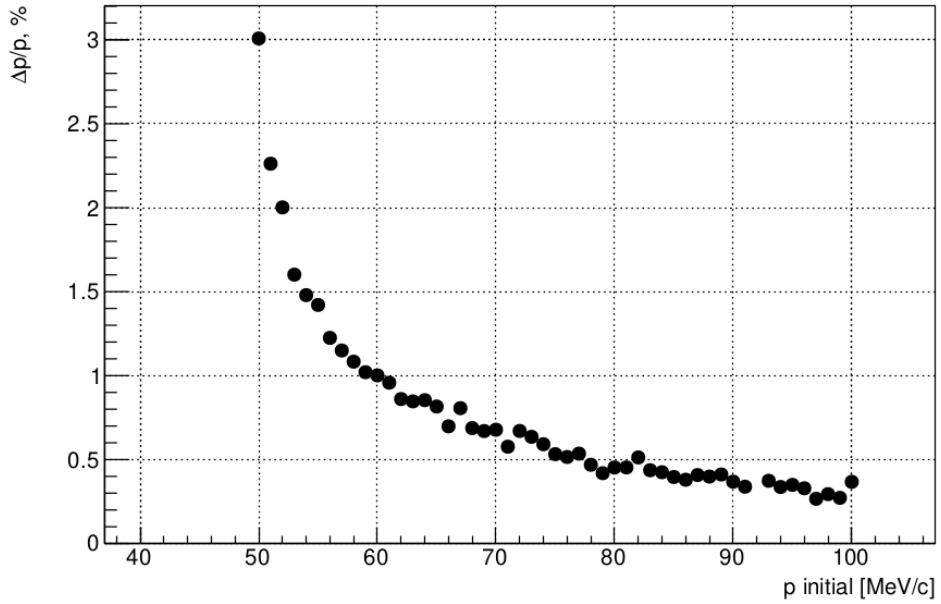
Total length along beam axis: 60 cm

Vacuum beampipe radius: 1.5 cm

Outer wall	
Material	Thickness
Copper	15 μm
Teflon	100 μm
G10	1 mm

TPC – cylindrical geometry





Momentum resolution vs initial momentum in the VP

Drift chamber

~40000 wires
- 11k sensitive, W-Rh(Au)
- 29k field, Al(Au)

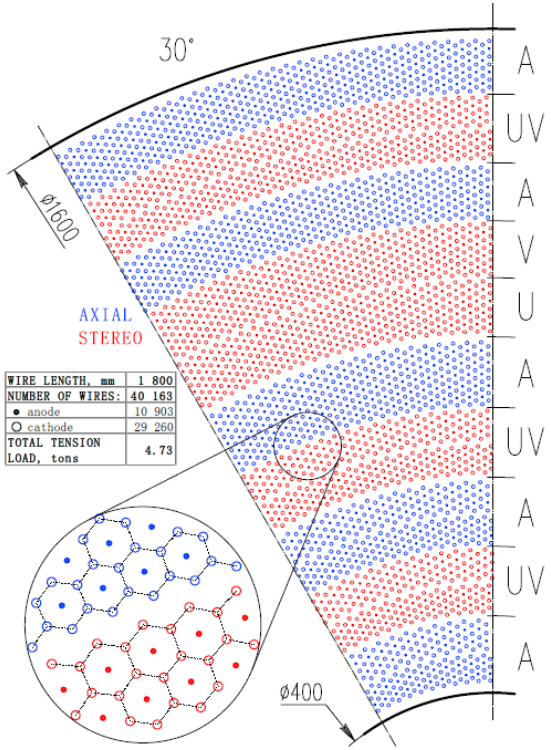
Hexagonal cell, 6.3-7.5 mm

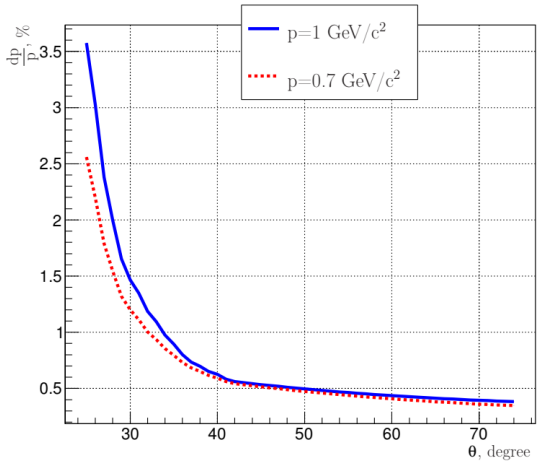
41 layers

60% He + 40% C_3H_8

$\frac{\sigma_{p_t}}{p_t} \approx 0.4\%$ at 1 GeV

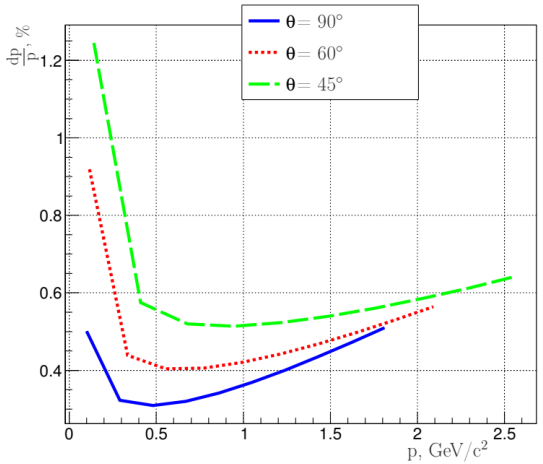
$\frac{\sigma_{dE/dx}}{dE/dx} \approx 6.9\%$





Momentum resolution

vs Θ



vs p

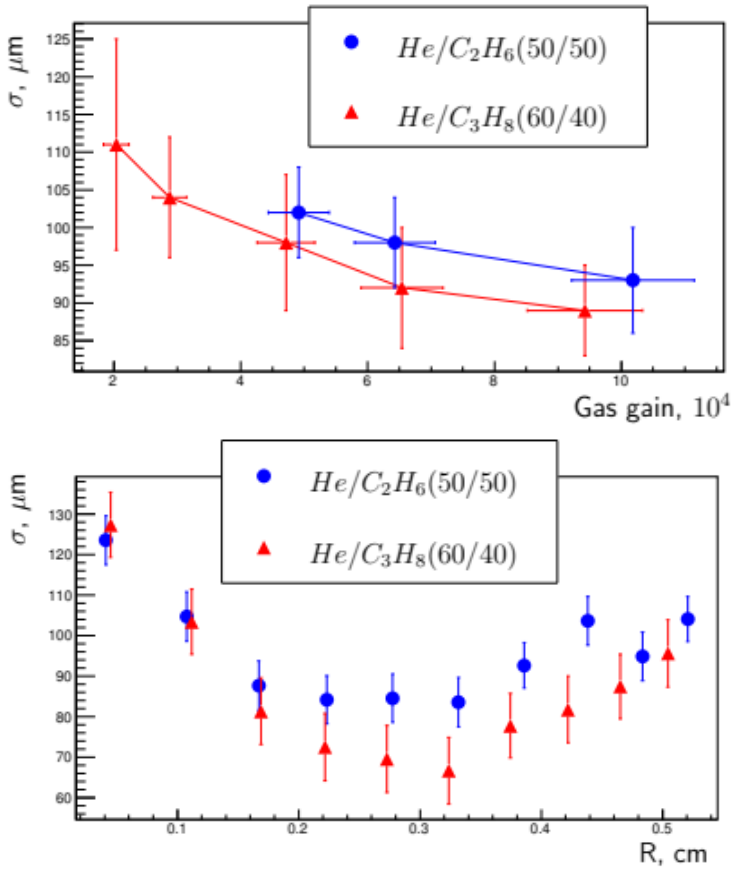
I.Yu.Basok et al., NIM A1009 (2021) 165490

Talk by I.Basok, 16/01 14:25

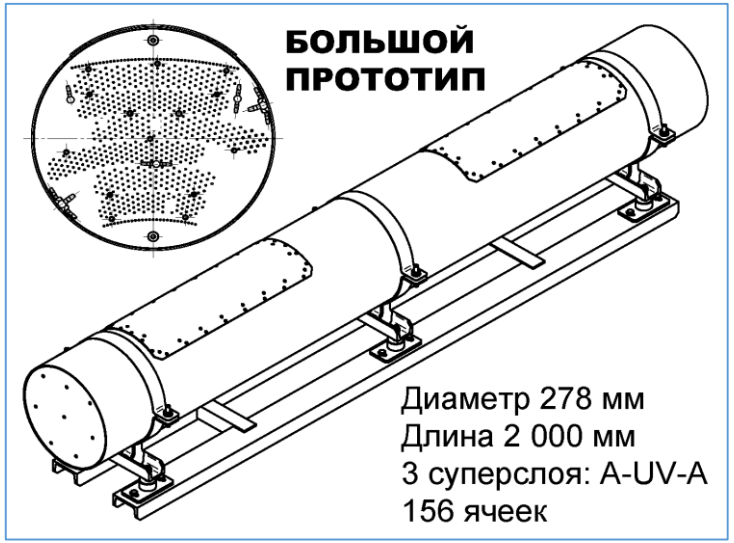
Drift chamber: prototyping

Small prototype
7 cells
In operation

+detailed simulation of cluster-counting mode



Measured spatial resolution



Large prototype (under construction)
156 cells

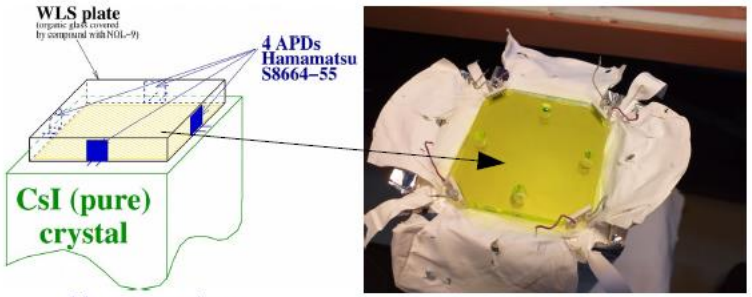
+ development of the new drift chamber for CMD-3 detector @BINP: smaller size, test of many aspects (materials, wires, electronics,…)

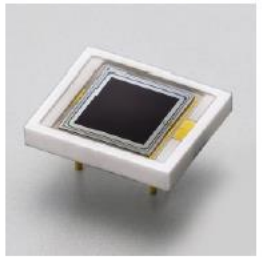
Calorimeter: prototype of pCsI option

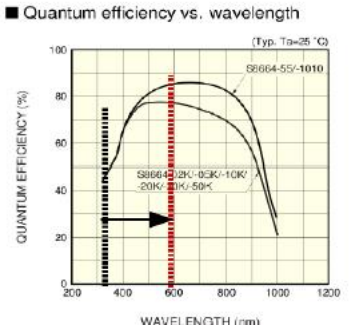
The calorimeter prototype is made of 16 counters:

- CsI(pure) crystal (6x6x30 cm^3)
- WLS plate with NOL-9
- 4 APDs (Hamamatsu S8664-55)
- 4ch preamp.

The UV scint. light (315 nm) from CsI(pure) is shifted to 590 nm by NOL-9 (nanostructured organic luminophore) where the QE of APD is maximal. The re-emitted light is captured in the plate and detected by 4 APDs.



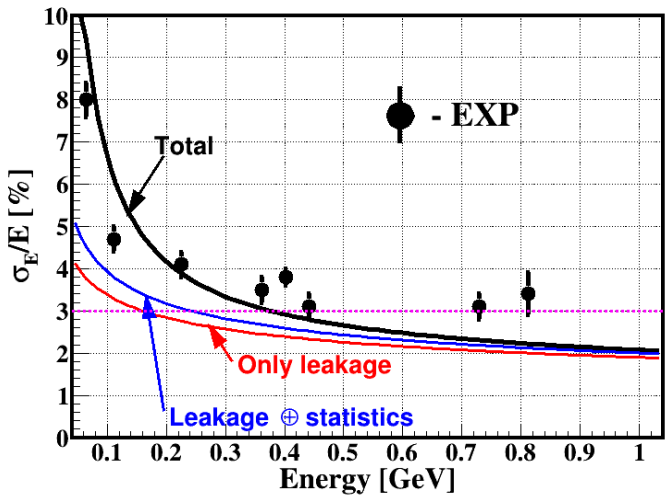




Talk by D.Epifanov, 16/01 10:50

Calorimeter: test beam studies

Test beam study of the prototype at the ROKK-1M facility in BINP was performed in June 2023. The preliminary result on the energy resolution of the prototype agrees with expectation.



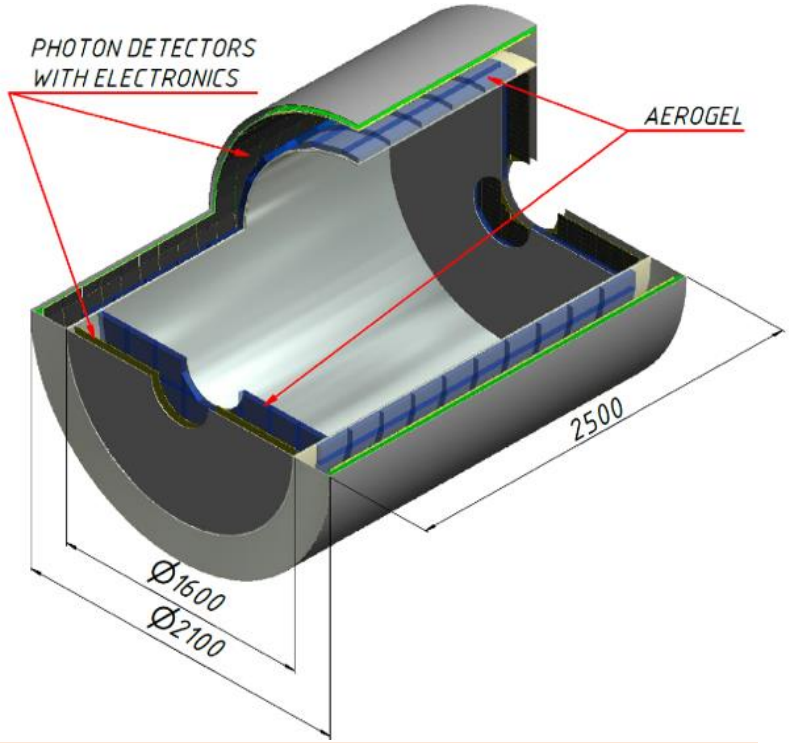
Talk by V.Bobrovnikov, Test beam facility, 17/01 11:45

PID: FARICH

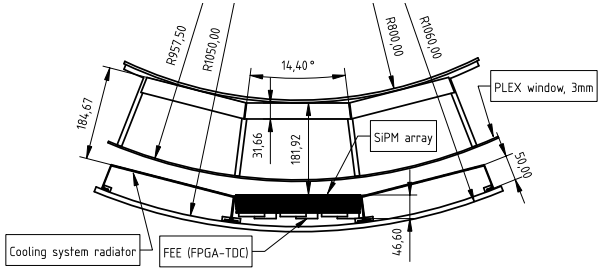
Requirements:

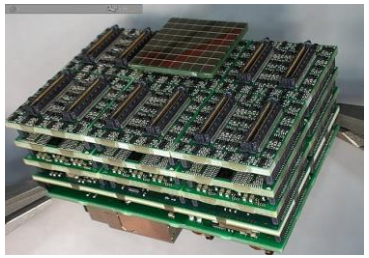
- π/K separation $> 4\sigma$ up to 3.5 GeV/c
- μ/π suppression ~1/40 for to 0.5-1.5 GeV/c

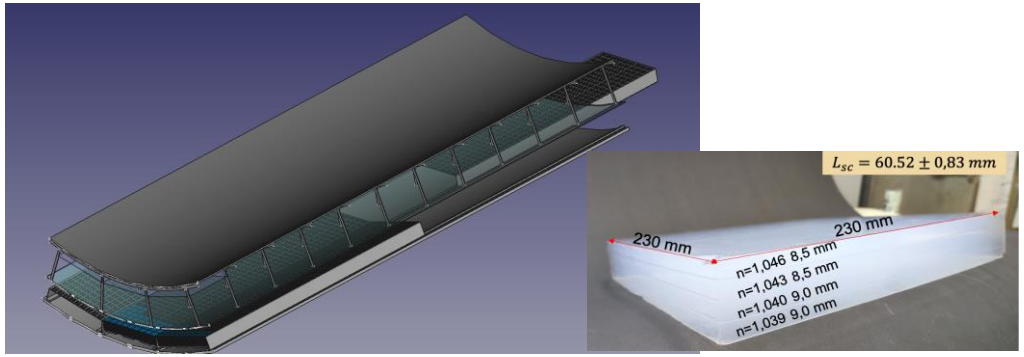
Test beam results: π/K up to 8.5 GeV/c & μ/π up to 1.7 GeV/c



Sketch and key elements







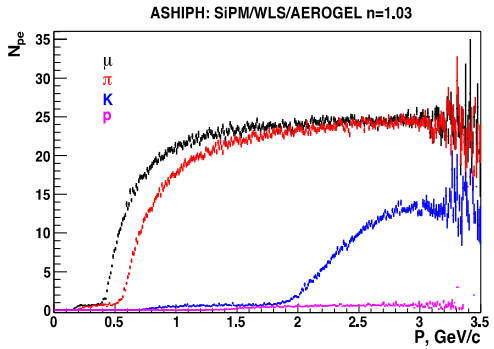
General parameters:

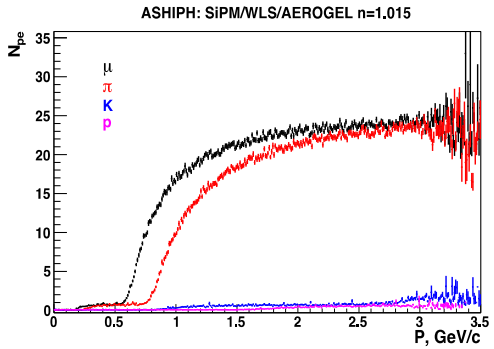
- Proximity focusing RICH
- 4-layer aerogel radiator
  n_{max} = 1.05, thickness 35 mm
- 21 m^2 total photon detector area
  - SiPMs in barrel (16 m^2)
  - MCP PMTs in endcaps (5 m^2)
- ~10^6 pixels with 4 mm pitch

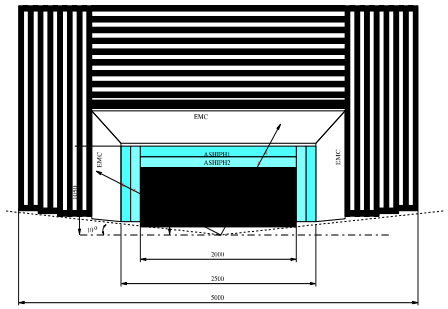
Talk by A.Barnyakov, 16/01 17:30

PID: ASHIPH Renaissance

ASHIPH-SiPM for the SCTF (Sarov)







ASHIPH with SiPM

- π/K-separation from 500 to 2000 MeV/c
- μ/π-separation from 400 to 900 MeV/c
- Preliminary design:
  - 6000 l of aerogel in three layers: n=1.03 (8 cm) and n=1.015 (8+8 cm)
  - 1400 counter with sizes ~ 18×30×8 cm
  - Amount of material ~ 15%X_0
  - Light collection – WLS(BBQ) and 28000 SiPMs 3×3 mm^2

ASHIPH-SiPM for SPD-NICA (Dubna)

Aerogel: 8cm+8cm & n=1.02

- $N_{pe}^{\Sigma}(\beta = 1) \approx 16$
- 128 counters 47x20x8 cm^3 in 2 layersvin 2 endcaps
- WLS – BBQ 470x14x3 mm^3
- (4)x5x128 =2560 SiPMs 6x6 mm^2

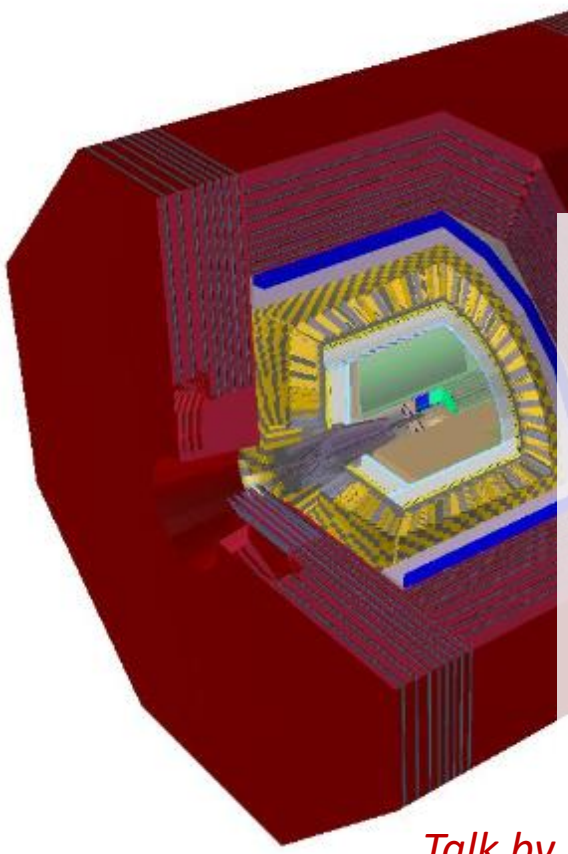
π/K– separation:

- $\geq 4\sigma$ – 0.7÷2.5 GeV/c (thresh. ~3pe)

+proposals for SND@VEPP-2000, VEPP-6

Talk by I.Ovtin, 16/01 10:00

Simulation/reconstruction framework



Aurora Framefork

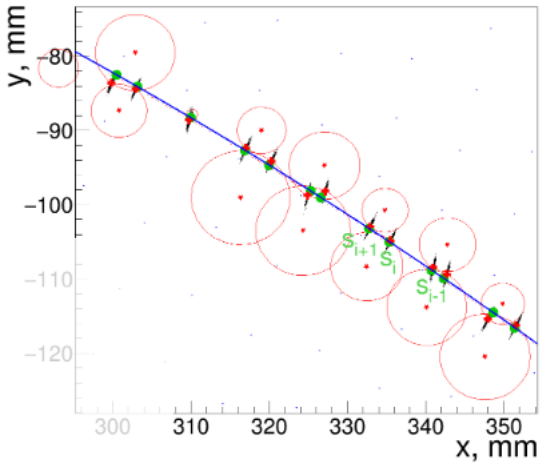
Release 2.1.0

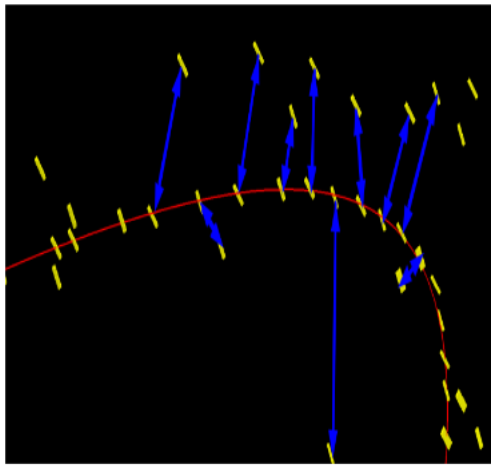
Event generators

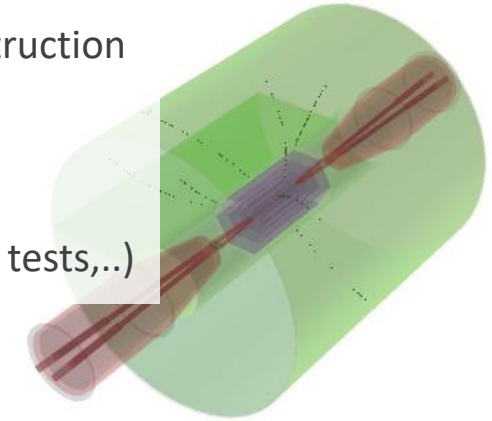
Geometry, digitization, reconstruction (with options)

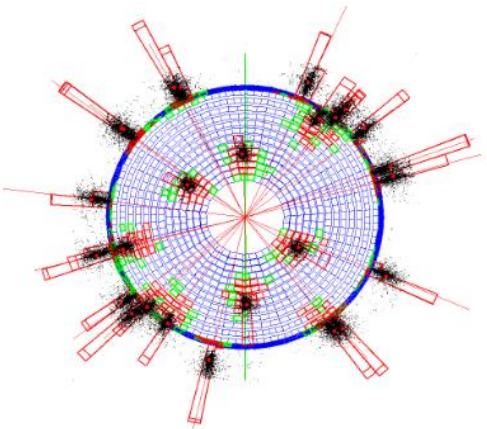
Fast simulation

Instrumentation (visualization, tests,..)









Talk by A.Sukharev, 16/01 16:30

Fast simulation

Computing and Software for Big Science (2024) 8:1
https://doi.org/10.1007/s41781-023-00108-7

RESEARCH

Check for updates

Fast Simulation for the Super Charm-Tau Factory Detector

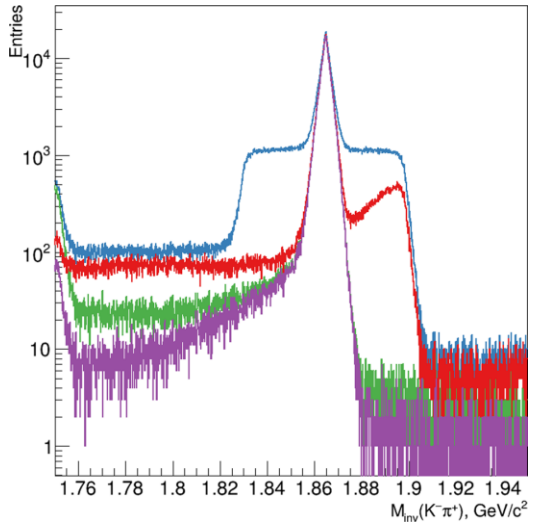
Alexander Barnyakov[1,3] · Maria Belozyorova[2] · Victor Bobrovnikov[1,2] · Sergey Kononov[1,2] · Dmitriy Kyshtymov[1,2] · Dmitry Maksimov[1,2] · Georgiy Razuvaev[1,2] · Andrey Sukharev[1,2] · Korneliy Todyshev[1,2] · Vitaliy Vorobyev[1] · Anastasiia Zhadan[1,2] · Daniil Zhadan[1,2]

Received: 22 November 2022 / Accepted: 7 December 2023

Abstract
The Super Charm-Tau factory (high luminosity electron-positron collider with 3–7 GeV center of mass energy range) experiment project is under development by the consortium of Russian scientific and education organizations. The article describes the present status of the Super Charm-Tau detector fast simulation and the algorithms on which it is based, example usage and demonstration of fast simulation results.

Keywords Super Charm-Tau factory · Fast simulation · Parametric simulation

A paper with a description of our model for fast simulation was published in a journal "Computing and Software for Big Science" (2024)



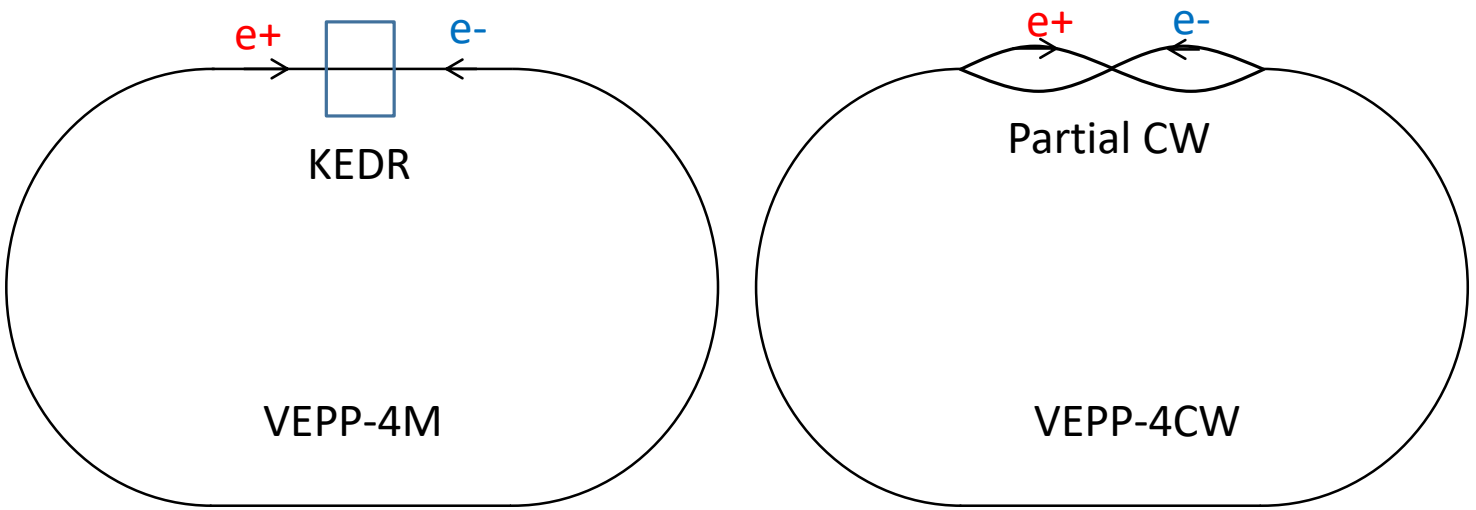
$M_{inv}(K^-\pi^+)$ in $D^0 \to K^-\pi^+$

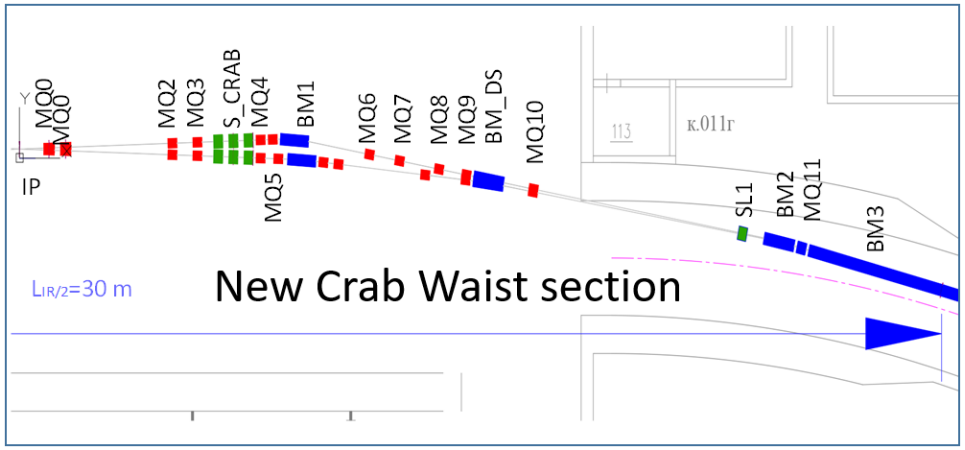
Related projects at BINP

The future research program at BINP is being discussed.

- SCTF R&D is important part of BINP research program.
- It motivates/tied to other research projects at BINP

Under consideration: CW at VEPP-4M





There is proposal to make a test of CW at VEPP-4M

What can be tested: final focus elements, nonlinear beam dynamics, beam-beam effects, backgrounds,…

VEPP-4M straight section is modified.
Electrostatic separation of colliding beams.

Beneficial for all future collider projects

Talk by E.Levichev, 16/01 11:25
Talk by S.Sinyatkin, 16/01 14:30

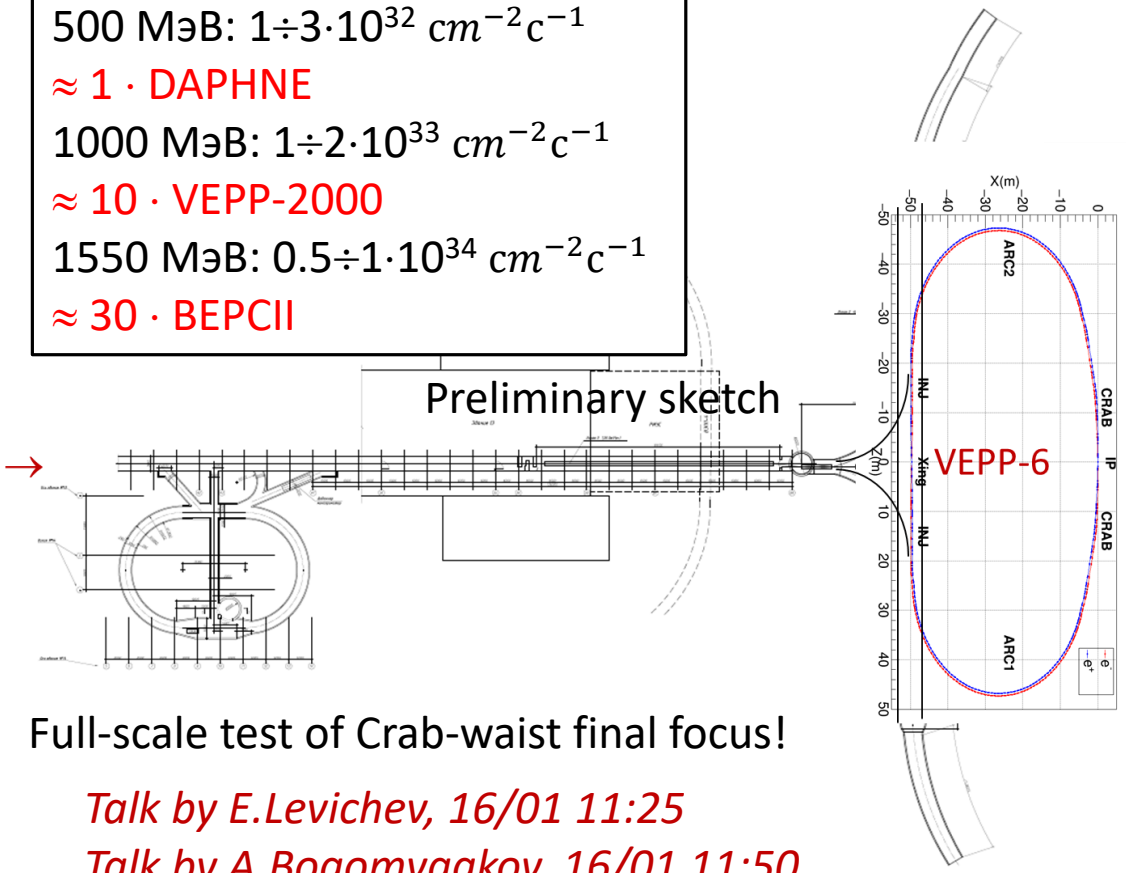
Under consideration: VEPP-6

- e^+e^- collider
  - Beam energy from <0.5 to 1.6 GeV (J/ψ) (2.0 GeV)
  - Luminosity $\mathcal{L} \approx 10^{34}\ cm^{-2}\mathrm{c}^{-1}$ @ 1.6 GeV
- General purpose detector
  - Tracking
  - Calorimetry
  - Particle ID
- Physics
  - J/ψ decays
  - Baryon thresholds
  - Measurement of R
  - … Complementary to SCTF

500 МэВ: $1\div3\cdot10^{32}\ cm^{-2}\mathrm{c}^{-1}$
≈ 1 · DAPHNE
1000 МэВ: $1\div2\cdot10^{33}\ cm^{-2}\mathrm{c}^{-1}$
≈ 10 · VEPP-2000
1550 МэВ: $0.5\div1\cdot10^{34}\ cm^{-2}\mathrm{c}^{-1}$
≈ 30 · BEPCII

Preliminary sketch

e+e- from → existing injector

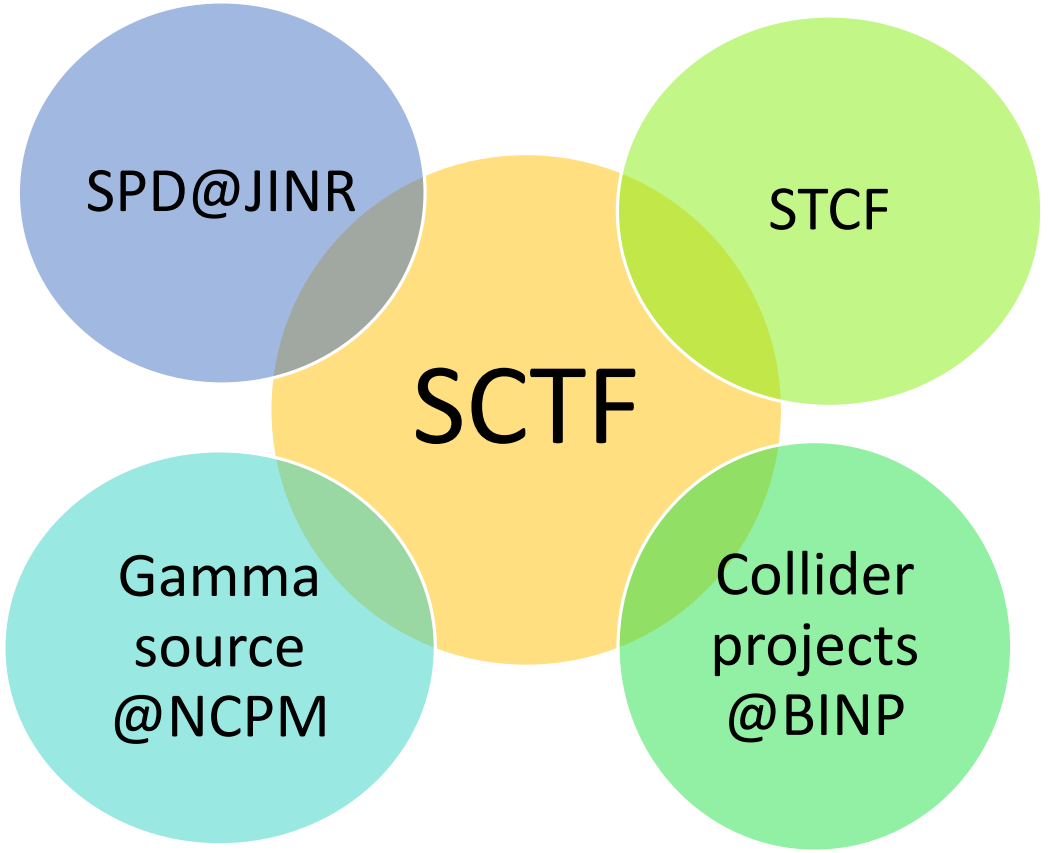


Full-scale test of Crab-waist final focus!

Talk by E.Levichev, 16/01 11:25
Talk by A.Bogomyagkov, 16/01 11:50

Synergy between SCTF and other projects

Detector technologies
(FARICH, magnet)
Software



Projects are deeply related

Linac development
Common infrastructure

CW studies
Detector technologies
Software

Summary

- There is rich physics program of experiments at Super c-tau factory
- There is wide program of R&D studies realized by collaboration of BINP and other institutions

Moving towards technical design

- Close collaboration with STCF would be mutually beneficial!
  - Detector technologies
  - Common working group for feasibility studies?
  - Participation of STCF organizations in BINP collider projects
  - ...and many more potential areas of collaboration