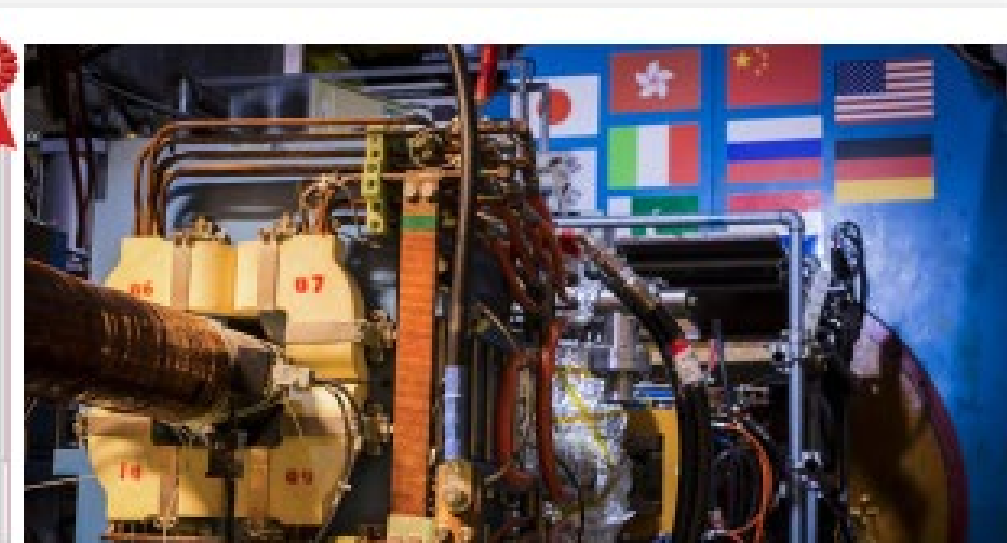


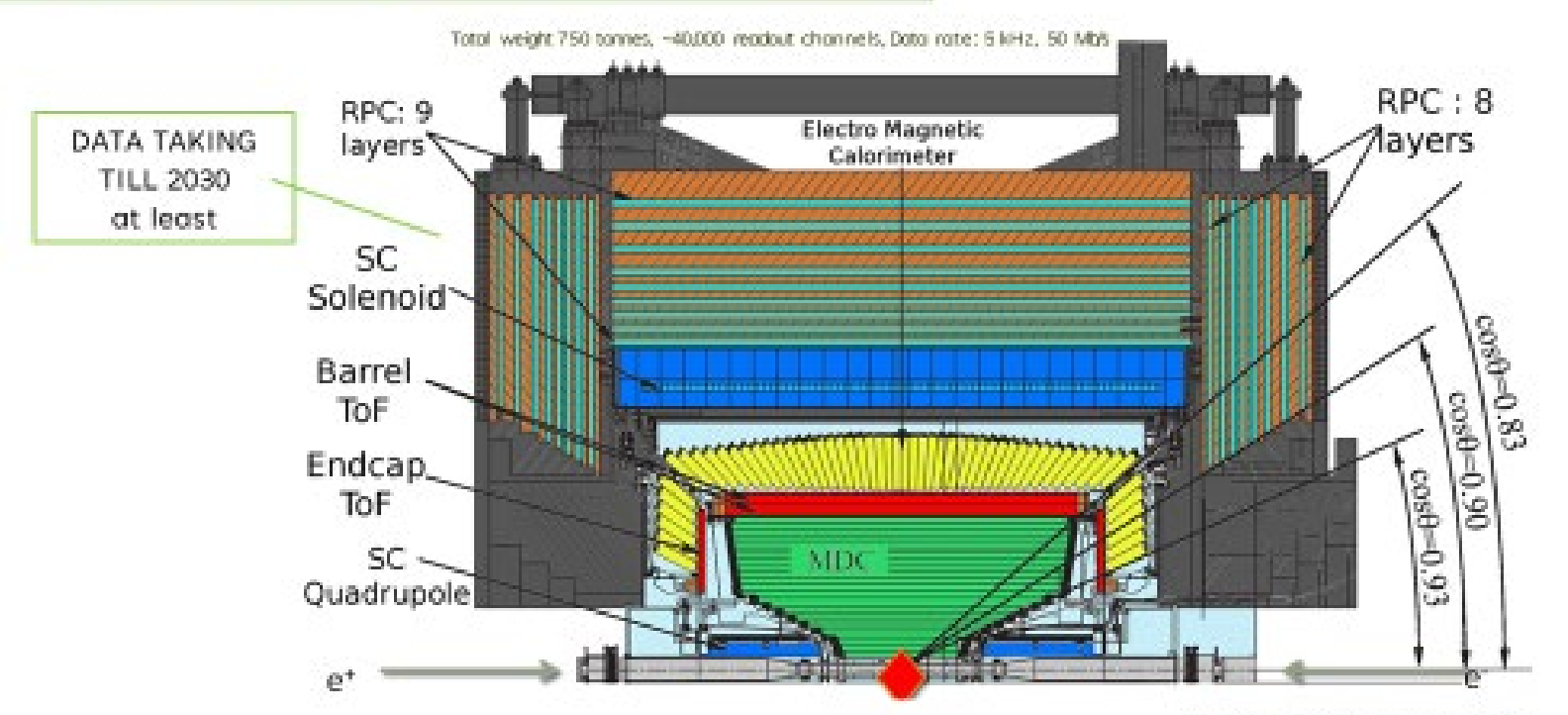
Argomenti di ricerca e proposte tesi del gruppo



2023.01.07 18:18:47	
Luminosity	10.50 E32/cm ² s
Energy [GeV]	1.8935
Current [mA]	885.64
Lifetime [h]	1.61
InjRate [mA/min]	0.00



BEIJING Spectrometer

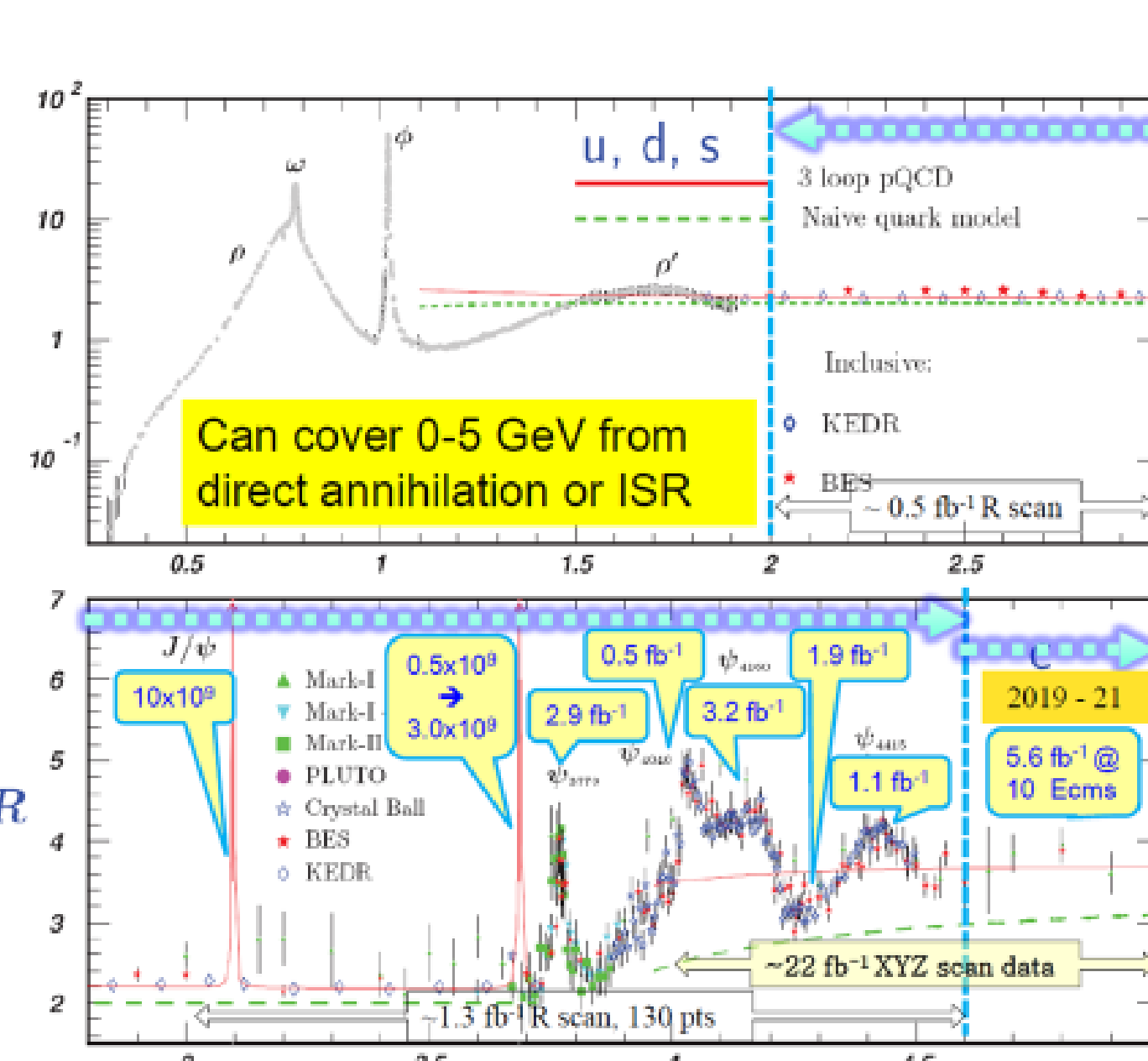


Muon counters:
 $\delta_{\mu} = 1.4 \text{ cm} - 1.7 \text{ cm}$
 Electromagnetic Calorimeter:
 $dE/E (1 \text{ GeV}) = 2.5 \%$
 Time Of Flight:
 $\sigma t (\text{barrel}) = 70 \text{ ps}$
 $\sigma t (\text{endcap}) = 60 \text{ ps}$
 Main Drift Chamber:
 $\sigma x (1 \text{ GeV}/c) \sim 130 \mu\text{m}$
 $d/p (1 \text{ GeV}/c) = 0.5 \%$
 SC solenoid:
 1T magnetic field

IHEP-Beijing Electron Positron Collider



LINAC
 中国科学院高能物理研究所
 Institute of High Energy Physics Chinese Academy of Sciences
 Construction started: 1984
 BEPC 1989-2005
 $L_{\text{peak}} = 1.0 \times 10^{31} / \text{cm}^2 \text{s}$
 BEPCII 2008-now $L_{\text{peak}} = 1.0 \times 10^{33} / \text{cm}^2 \text{s}$
 $E_{\text{cm}}: 2 - 4.95 \text{ GeV}$
 BEPCII Upgrade foreseen in 2024
 Beam energy $\gg 2.8 \text{ GeV}$
 $Lx3 @ 2.35 \text{ GeV}$



BESIII physics program datasets

- Light hadron
- Charmonium
- Charm
- τ /R/QCD
- New physics

- world's largest 10B J/ψ dataset for light hadron searches

- 2.7B $\psi(2S)$ for conventional charmonia below threshold

- 30/fb for XYZ measurements and above threshold searches

- fine scan at low mass for R and light hadron searches (about 139 points)

HIGHLIGHTS

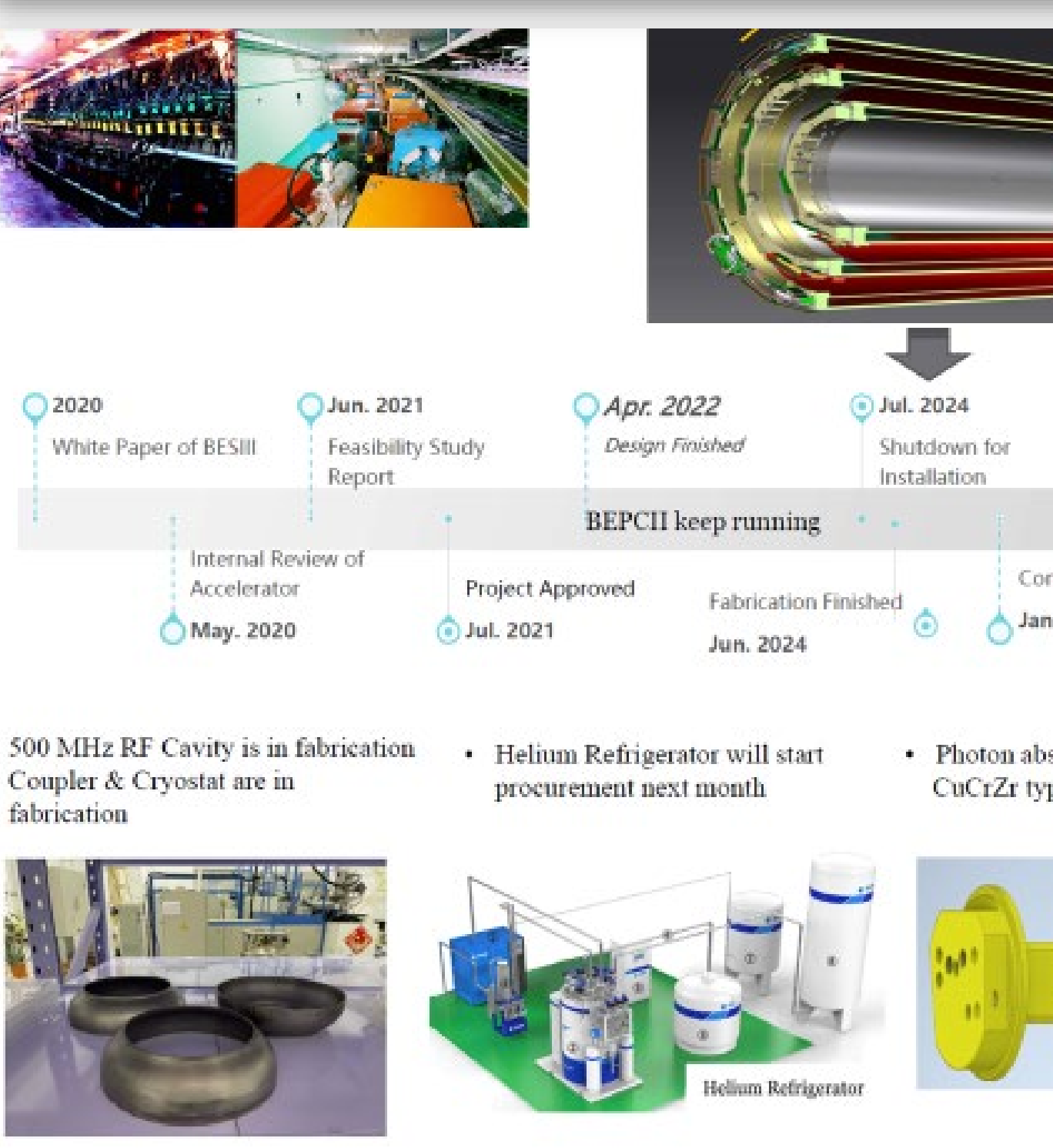
BESIII observes new mystery particle

w Tetraquark Spotted in Electron-positron Collisions

Nature physics

Quark quartet opens fresh vista on matter

BESIII publications (May 9, 2023)



CGEM-IT

Operation in 1T magnetic field
 $\sigma_{xy} \sim 130 \mu\text{m}$
 $\sigma_z < 1 \text{ mm}$
 $\sigma_{pT}/p_T \sim 0.5\% @ 1 \text{ GeV}/c$
 Material budget $\sim 1.5\% X_0$
 High rate capability: $10^4 \text{ Hz}/\text{cm}^2$

Ar - IC4H10 (90% - 10%)
 HV 280/280/275 V
 E field 1.5/3/3/5 kV/cm

Match MDC tracking performance

Improve

- Low spatial charge
- high rate capability (at least $10^4 \text{ Hz}/\text{cm}^2$)
- fast response
- light support frame
- low aging
- better z resolution ($\sim 350 \mu\text{m}$)
- better secondary vertex reconstruction

- Studi di fattibilità, ottimizzazione selezioni del segnale, studio del background (triennali)
- Studio di decadimenti e transizioni del charmonio
- Ricerca di decadimenti deboli della J/ψ (elevatissima statistica disponibile)
- Misura delle fase tra ampiezza forte ed elettromagnetica nei decadimenti di J/ψ e $\psi(2S)$ in K^+K^- , $\omega\pi^0$
- Studio di stati finali contenenti il mesone phi

- Cloud Toy
- Standardizzazione dei siti di computing distribuito
- Sviluppo delle infrastrutture e tools di produzione

- Commissioning elettronica e rivelatore @IHEP
- Analisi dati cosmici per studio performance CGEM-IT
- Sviluppi firmware su FPGA
- Adattamento del sistema di acquisizioni e analisi a nuovi progetti

BESIII Collaboration

15 countries, 72 institutions
 ~600 members

BESIII Italian Collaboration

Per informazioni, curiosità, approfondimenti

francesca.demori@unito.it

michela.greco@unito.it

simonetta.marcello@unito.it

fabrizio.bianchi@unito.it

marcogiovannimaria.destefanis@unito.it

marco.maggiora@unito.it

stefanogiovanni.spataro@unito.it