SRF-based new accelerator projects in China: Related Infrastructures and Industries

Dong Wang
Shanghai Institute of Applied Physics
and Hard XFEL project at Shanghai
TTC Meeting, Milan, Italy
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Acknowledgements

- IHEP: W. Pan, J. Gao, R. Ge, J. Zhai, F. He, P. Zhang
- IMP: W. Zhan, H. Zhao, Y. He.
- PKU: K. Liu, S. Lian, J. Hao
- OTIC: H. Zhao
- Wuxi: H. Lu
- HIT: J. He
Outline

• Large accelerator projects in China
• SRF R&D needed for large projects
• New infrastructures in next 2 years
• Related Industries
• Remarks
# Large Accelerator Projects in China (2005-2025)

<table>
<thead>
<tr>
<th>Year</th>
<th>HEP</th>
<th>SR</th>
<th>XFEL</th>
<th>NP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>BEPC-II (500MHz SRF)</td>
<td>SSRF (500MHz SRF)</td>
<td></td>
<td>CSR</td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td>FEL-TF (1.3/3.9GHz SRF)</td>
<td>CSNS</td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>CEPC R&amp;D (650/1300MHz SRF)</td>
<td>HEPS (166/500 MHz SRF LE)</td>
<td>SCLF (1.3/3.9GHz SRF)</td>
<td>CADS (81-650MHz SRF)</td>
</tr>
<tr>
<td>2025</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2030</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

- **HEPC-II**: 500MHz SRF
- **SSRF**: 500MHz SRF
- **FEL-TF**: 1.3/3.9GHz SRF
- **SCLF**: 1.3/3.9GHz SRF
- **CSR**: operation
- **CSNS**: construction
- **CADS**: approved
- **HIAF**: Phase-II proposal

*~1000 sc cavities in ~7 years*
# Large Accelerator Projects in China

<table>
<thead>
<tr>
<th>Year</th>
<th>Host</th>
<th>Type</th>
<th>Dimen.</th>
<th>Energy</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEPC-II</td>
<td>IHEP</td>
<td>e+e- ring</td>
<td>240m C</td>
<td>2.5 GeV</td>
<td>~100M $</td>
</tr>
<tr>
<td>SSRF</td>
<td>SINAP</td>
<td>e- ring</td>
<td>432m C</td>
<td>3.5 GeV</td>
<td>220M $</td>
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<tr>
<td>CSR</td>
<td>IMP</td>
<td>i ring</td>
<td>129m C</td>
<td>0.4 GeV/u</td>
<td>~50M $</td>
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<tr>
<td>CSNS</td>
<td>IHEP-GD</td>
<td>p lin+ring</td>
<td>100+200m</td>
<td>1 GeV</td>
<td>~330M $</td>
</tr>
<tr>
<td>XFEL-TF</td>
<td>SINAP</td>
<td>e- linac</td>
<td>293m L</td>
<td>0.8 GeV</td>
<td>~30M $</td>
</tr>
<tr>
<td>XFEL-UF</td>
<td>SINAP</td>
<td>e- linac</td>
<td>532m L</td>
<td>1.5 GeV</td>
<td>110M $</td>
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<tr>
<td>CiADS</td>
<td>IMP-GD</td>
<td>p linac</td>
<td>~200m L</td>
<td>0.5 GeV</td>
<td>~400M $</td>
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<tr>
<td>HIAF</td>
<td>IMP-GD</td>
<td>i lin+ring</td>
<td>~530m C</td>
<td>4.2 GeV/u</td>
<td>~350M $</td>
</tr>
<tr>
<td>H-XFEL</td>
<td>SINAP</td>
<td>e linac</td>
<td>3100m L</td>
<td>8 GeV</td>
<td>~1.4B $</td>
</tr>
<tr>
<td>HEPS</td>
<td>IHEP</td>
<td>e ring</td>
<td>1300m C</td>
<td>6 GeV</td>
<td>~700M $</td>
</tr>
</tbody>
</table>

GD: Guangdong Province (near Hongkong)

Cost: rough amount in USD for easy understanding

- heavily SRF
Newly approved large accelerators in China

Friday: W. Zhan’s talk

Wednesday: P. Zhang’s talk

Wednesday: J. Chen’s talk
Maps of new accelerator projects in China

- **HEPS**
- **IHEP**
- **IMP**
- **SINAP**
- **XFEL**
- **HIAF & CADS**
- **IHEP-GD**

Institution:
- China
- Shanghai
- Beijing
- Chengdu
- Hong Kong

Project:
- XFEL
- HEPS
- IHEP
- IMP
- SINAP
- HIAF & CADS

China

North Korea

South Korea

Japan

North Korea

South Korea

Japan
<table>
<thead>
<tr>
<th></th>
<th>Energy</th>
<th>Current /particle</th>
<th>Mode</th>
<th>SRF Cavities</th>
<th>Key RF-related issues</th>
<th>note</th>
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</thead>
<tbody>
<tr>
<td>CADS</td>
<td>0.5 GeV</td>
<td>5mA</td>
<td>proton cw-linac</td>
<td>162/325/650 MHz, ~200</td>
<td>High current cw p linac</td>
<td></td>
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<tr>
<td>HIAF</td>
<td>4.25 GeV / u</td>
<td>1E11u</td>
<td>heavy-ion accelerator</td>
<td>81/162/325 MHz, ~100cav</td>
<td>High current cw i linac</td>
<td></td>
</tr>
<tr>
<td>XFEL</td>
<td>8 GeV</td>
<td>0.2 mA</td>
<td>electron cw-linac</td>
<td>1.3GHzx600 3.9GHzx16</td>
<td>High Q Mass produc.</td>
<td></td>
</tr>
<tr>
<td>HEPS</td>
<td>6 GeV</td>
<td>200 mA</td>
<td>electron cw-ring</td>
<td>166MHzx5 500MHzx2</td>
<td>Low freq. SRF for e ring</td>
<td></td>
</tr>
</tbody>
</table>
## SRF R&D Infrastructures: so far

**2010-2017**

### General information of SRF R&D programs

<table>
<thead>
<tr>
<th></th>
<th>IMP</th>
<th>IHEP</th>
<th>PKU</th>
<th>SINAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driven project</td>
<td>ADS</td>
<td>ADS/ILC</td>
<td>ILC/FEL</td>
<td>SR</td>
</tr>
<tr>
<td>Infrastructure locations</td>
<td>Old campus Lanzhou</td>
<td>Old campus Beijing city</td>
<td>Old campus Beijing city</td>
<td>Old campus Jiading</td>
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<tr>
<td>SRF R&amp;D fund</td>
<td>~50M$</td>
<td>~50M$</td>
<td>~10M$</td>
<td>~10M$</td>
</tr>
</tbody>
</table>

### SRF Infrastructures in major institutions

<table>
<thead>
<tr>
<th></th>
<th>Cryoplant-T</th>
<th>VTS</th>
<th>Space</th>
<th>EP</th>
<th>CM-int./HT</th>
<th>N_dope</th>
</tr>
</thead>
<tbody>
<tr>
<td>PKU</td>
<td>70W@2K</td>
<td>1x2cav</td>
<td>~1000m²</td>
<td>Yes</td>
<td>2-cav</td>
<td>Yes/s</td>
</tr>
<tr>
<td>IHEP</td>
<td>100W@2K</td>
<td>1x2cav</td>
<td>~2000m²</td>
<td>Yes</td>
<td>1-cav</td>
<td>Yes/s</td>
</tr>
<tr>
<td>IMP</td>
<td><strong>850W@4K</strong></td>
<td>1x1cav</td>
<td>~2000m²</td>
<td>Yes</td>
<td><strong>6-cav</strong></td>
<td>No</td>
</tr>
<tr>
<td>SINAP</td>
<td>60W@4K</td>
<td>1 cav</td>
<td>~2000m²</td>
<td>No</td>
<td>1-cav</td>
<td>No</td>
</tr>
</tbody>
</table>

EP/N_dopings are off-site
SRF Infrastructures at IMP (Lanzhou)

- Cavity assemble
- Assemble in clean room
- Cryogenic plant, 850W, 4.2 K
- Coupler condition system
- Complex acid
- EP system
- HPR system
- Ultrapure water system
- BCP system
- Plasma condition system
SRF cavities R&D for ADS at IMP

HWR010  HWR015  CH  Double Spoke  Single Spoke  elliptical

CW proton 25MeV, ADS Injector

HWR010 and HWR015 by IMP

Spoke by IHEP
Complete cryomodules for various projects have been developed, e.g. BEPC-II (500MHz), C-ADS (325MHz), ILC R&D (1.3GHz)
SRF infrastructure at IHEP

SRF testing

- 2K (100W) VT dewar with refrigerator-close cycle
- One test circle per week (at most 2 x 1.3GHz 9cell cavities at a time)
PKU SRF infrastructure

LHe system  2K Pumping system

VTS Dewar  Insert  Magnetic shield

VTS
SXFEL project includes sc cavity R&D
6 Large Grain 1.3GHz cavities made in OTIC
Large grain cavities: VT results by PKU

- $E_{\text{acc}} > 25 \text{ MV/m}$ (SCLF baseline: $16 \text{ MV/m}$, blue)
- $Q_0 \sim 1.6-2.4 \times 10^{10}$ @ 2K, at 16 MV/m, $\sim 3.5 \times 10^{10}$ @ 1.8K

- $Q_0(1.8\text{K})/Q_0(2.0\text{K}) = 1.50-1.79$ (@$\sim 16 \text{ MV/m}$)
- Operation @1.8 K could be an option
Horizontal tests of 1.3 GHz CM (2-LG cavities) at PKU

Horizontal test setup:
- Pulse mode: 0.5 Hz, 700 ms
- $Q_e \sim 6 \times 10^8$ for Q-E measurement

$E_{acc} > 20$ MV/m without quench

Q-drop after 15 MV/m:
Caused by Cryogenic capacity limitation (~55 W at 2 K for cooling down both 3.5-cell injector and 2×9-cell cryomodule) and probably field emission
N-doping: initial results by IHEP and PKU

IHEP 650MHz single-cell cavity N-doping
PKU N-doped 1.3GHz cavity

IHEP/PKU/SINAP to have 9-cell cavity EP/N-doping in 2018
Infrastructure on SRF at SINAP

- Mechanical Polish
- Clean-room
- Buffered Chemical Polishing
- Ultra-Pure Water
- High Pressure Rinsing
- Annealing
- Roots pumps
- Vertical Test
SRF Infrastructure and R&D so far

• Proton cw linac machine:
  ADS R&D made significant advances in past years
  by IMP/IHEP teams
  foundations for CADS/HIAF projects

• Electron cw linac :
  R&D / infrastructure much underfunded.
  huge efforts needed to take new challenges facing
  us on Hard XFEL at Shanghai

  2017 is turning point as Shanghai XFEL and HEPS
  projects(prototyping and construction) got funded.
New projects: huge challenges

HIAF
- Intense R&D done

CADS

HEPS
- Dedicated R&D since 2016

SCLF
- Limited R&D through XFEL-TF special focus
Shanghai Hard X-ray FEL

Injector
Linac
Switchyard

SINAP

STU
SARI

Near Hall
Far Hall
Beam Dump
Undulator
EXFEL, LCLS-II(HE) and Shanghai XFEL

<table>
<thead>
<tr>
<th></th>
<th>European XFEL</th>
<th>LCLS-II (HE)</th>
<th>Shanghai XFEL</th>
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</thead>
<tbody>
<tr>
<td>RF mode</td>
<td>Pulsed</td>
<td>CW</td>
<td>CW</td>
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<tr>
<td>Power source</td>
<td>Klystron</td>
<td>SSA</td>
<td>SSA</td>
</tr>
<tr>
<td>Install</td>
<td>Single ac Tunnel</td>
<td>Tunnel + Gallery</td>
<td>Single ac Tunnel</td>
</tr>
<tr>
<td>2K heat load/CM</td>
<td>~20w/CM</td>
<td>~80w/CM</td>
<td>~80w/CM</td>
</tr>
<tr>
<td>Tunnel slope</td>
<td>~</td>
<td>0.5%</td>
<td>~</td>
</tr>
<tr>
<td>N of modules</td>
<td>~100</td>
<td>~35 (+19)</td>
<td>~75</td>
</tr>
<tr>
<td>2K capability</td>
<td>~3kW</td>
<td>~2 x 4kw</td>
<td>~3x4 or 4x3 kw</td>
</tr>
</tbody>
</table>
CMs and cryogenic system

Shaft#1

Purification → Compressor → 4.5K CB → Lhe Dewar → 2K CB → CP1

Dis. Box

Shaft#2

Purification → Compressor → 4.5K CB → Lhe Dewar → 2K CB → CP3

Dis. Box

75+2 CMs
40 SCUs@4K
3 x 4kW@2K or 4 x 3kW@2K

Shaft#2

Purification → Compressor → 4.5K CB → Lhe Dewar → 2K CB → CP3

Dis. Box

L0 LH L1 BC1 L2(CM4-21) BC2 L3(CM22-CM45) warm section L4(CM46-CM75)

6CMs

SCLF
Cryogenic plant:  ~12kW@2K total

Operating points in considerations

- Gradient: 14~18MV/m
- Qo: 2.0~3.0E10
- Load_d: 4~8kW@2K
- Plant: ~12 kW@2 K

- For Q0 ≥3E10 @ 16 MV/m
  Surface treatment : N-doping, infusion
  Lots prototyping ahead
- For Q0 ≥2E10 @ 16 MV/m
  State-of-art non-doping cavities
  Large grain materials
  2.0 K→1.8K operating

TESLA 9-cell 1.3GHz cavity
Cryomodule
based on EXFEL&LCLS-II type
SCLF strategy on SRF

- TESLA type cavity/cryomodule technology are well established, thanks to the continues global efforts especially by TTC and EXFEL/LCLS-II project.
  - join and cooperate with community, hopefully make contributions

- Major components have been industrialized.
  - multi commercial suppliers (to deal with tendering/bidding procedures of funding agencies)

- Novel technologies (N-Doping, infusion, etc.) are of great importance to project for cost-effective performance and future potentials.
  - all for it since now, while keep other options going

- CM Integration/SRF Testing need to be taken care of on-site to a large extent unless good partners found
  - build-up full capabilities while look for collaborating institution/industry
## SRF R&D Infrastructures: next

2018-2019 (fully funded, ongoing)

General information of SRF R&D programs

<table>
<thead>
<tr>
<th>IMP</th>
<th>IHEP</th>
<th>PKU</th>
<th>SINAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driven project</td>
<td>HIAF/ADS</td>
<td>HEPS/CEPC/ILC/ADS</td>
<td>XFEL</td>
</tr>
<tr>
<td>Infrastructure locations</td>
<td>HIAF site Huizhou</td>
<td>HEPS site Huairou</td>
<td>Same location</td>
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<tr>
<td>SRF R&amp;D fund</td>
<td>TBD</td>
<td>~50M$</td>
<td>~10M$</td>
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</table>

### SRF Infrastructures in major institutions

<table>
<thead>
<tr>
<th>PKU</th>
<th>IHEP-HR</th>
<th>IMP-GD</th>
<th>SINAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryoplant-T</td>
<td>70W@2K</td>
<td>300W@2K</td>
<td>1000W@2K</td>
</tr>
<tr>
<td>VTS</td>
<td>1x2cav</td>
<td>3x4cav</td>
<td>4x4 cav</td>
</tr>
<tr>
<td>Space</td>
<td>~2000m$</td>
<td>~4500m$</td>
<td>~8000m$</td>
</tr>
<tr>
<td>CM-int./HTS</td>
<td>2-cav CM</td>
<td>8-cavCM/2HT</td>
<td>8-cavCM/4HT</td>
</tr>
<tr>
<td>EP/N_doping</td>
<td>Yes/9-cell</td>
<td>Yes</td>
<td>Yes/9-cell</td>
</tr>
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</table>
Locations of SRF infrastructure / Industry

New SRF infrastructures are around new projects!
落实以工作分解（WBS）为基础的任务书、进度计划、经费概算的细化，确保不漏项；形成责权利一体的岗位责任体系。

加快对紧缺岗位的人员招聘和引进。

以建安方案调整、深化施工图设计为契机，深化和细化工艺技术要求和方案设计；

以重大专项首先启动的低温测试系统为工作抓手；

加速器总体管理团队逐步完善。

---

Photon science complex at Shanghai

SSRF
3.5GeV Light Source

Soft XFEL User Facility
1.5GeV e- / ~1keV x-ray
532m, 2 FEL lines/5 stations

Hard XFEL
8 GeV SC, 3.1km
3 FEL lines, 10 stations
SRF R&D Halls and cryogenic plant at SINAP

- Cryogenic plant 1kW@2K
- For SRF R&D only
- Ready mid 2020

Vertical test caves

40m tunnel for horizontal tests

ISO4 clean room
New SRF infrastructure at SINAP

- 2 SRF Halls + CM storage: total 8000m$^2$
- SRF treatments/CM integrations
- 1kW@2K cryogenic plant
- 4 VT caves
- 2x40m bunkers: 4 HTS

Different scenarios envisioned
- 4x4-cavity and 4xCM tests
- 2-CMs HT with interconnect
- gun + 1-2 CMs = beam test
- SXFEL wide tunnels for several CMs (~ a SC VUV FEL)
Domestic & international collaborations on prototypes & R&D

- at least 5 prototype CMs (CM#-5 to CM#-1)
  - component R&D and supply chain
  - cavity VT and component tests (use PKU/IHEP VTS until 2020)
  - CM integrations
  - HT (1kW CP ready in 2020)

- N-Doping, infusion R&D
  - infrastructure
  - above all, build up a good team (& collaborations)
  - recruiting both experienced & young people
  - reviews/workshops/committees ahead
IHEP‘s new infrastructure: PAPS

- “Platform of Advanced Photon Source Technology R&D”, to provide infrastructure for construction of future project.
- Budget: 500M CNY funded by Beijing Gov.
- Construction: 2017.5-2020.6
- Consist of 7 systems:
  - RF system
  - Cryogenic system
  - Magnet technology
  - Beam test
  - X-ray optics
  - X-ray detection
  - X-ray application
Layout of the SRF facility at IHEP’s PAPS

- 3 VT dewars
- 2 HT caves
- 500m² CR
- FPC aging in CR ISO7
- Optic inspec.
- Pre-tuning
- Furnace
- Nb₃Sn oven
- Nb-Cu sputtering
- T-mapping
- Second sound
- ......
New infrastructure at HEPS campus

- **SRF facility construction**
  - Civil construction is on going, and will be finished by Oct. 2018.
  - Purchase on equipments is on going, and installation will be finished by Mar. 2019.
  - Commissioning of the cryogenic system will be finished before Oct. 2019.

- **R&D activities**
  - N-doping study has started: samples were analyzed; baseline cavities were tested; more cavities were under fabrication.
  - Tunable FPC for CEPC has been designed.
### SRF related industry: a glance

#### Domestic suppliers of major SRF components (incomplete)

<table>
<thead>
<tr>
<th></th>
<th>Nb-materials</th>
<th>Cavity-FPC</th>
<th>Cryostat</th>
<th>SSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX-OTIC (-PKU)</td>
<td>int. supplier</td>
<td>Cavity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HERT (-IHEP)</td>
<td></td>
<td>Cavity/FPC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIT (-IMP)</td>
<td></td>
<td>Cavity</td>
<td></td>
<td></td>
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<tr>
<td>RuiYuan (-IMP)</td>
<td></td>
<td>Cavity</td>
<td></td>
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<tr>
<td>WUXI-inno.</td>
<td></td>
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<td>Wanrui-</td>
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<td>BG-electronics</td>
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<tr>
<td>CD</td>
<td></td>
<td></td>
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</table>
## SRF cavity supplier- Ningxia OSTEC

<table>
<thead>
<tr>
<th>#</th>
<th>Cavity type</th>
<th>Number</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>1.5GHz single cell</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>HWR $\beta=0.29$ For FRIB</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>1.5GHz 7cell</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>$\beta=0.085$ 162.5MHz QWR</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>325MHz HWR</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>1.3GHz 3cell slot cavity</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>162.5MHz Taper HWR015</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Spoke012</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>Spoke021</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>1.3G single cell</td>
<td>12</td>
</tr>
<tr>
<td>11</td>
<td>650MHz single cell/2-cells</td>
<td>3 / 2</td>
</tr>
<tr>
<td>12</td>
<td>162.5MHz Taper HWR009</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>Large grain 1.3GHz 9cell</td>
<td>6</td>
</tr>
<tr>
<td>14</td>
<td>Deflection cavity</td>
<td>1</td>
</tr>
</tbody>
</table>
Beijing HE-Racing Technology company is experienced in production of jacked SRF cavities, FPC couplers, and other NC accelerator components.

A new post processing facility is to be built in 2018.
14 SRF cavities have been fabricated, including spoke cavities, elliptical cavities, and QWRs.

More elliptical and spoke cavities are in progress

Capability: ~80 cavities per year.

<table>
<thead>
<tr>
<th>Cavity type</th>
<th>Freq.(MHz)</th>
<th>Time</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-ADS Spoke012</td>
<td>325</td>
<td>2015</td>
<td>Beam commissioned</td>
</tr>
<tr>
<td>C-ADS Spoke021</td>
<td>325</td>
<td>2015</td>
<td>Beam commissioned</td>
</tr>
<tr>
<td>ILC 9cell TESLA</td>
<td>1300</td>
<td>2016</td>
<td>Vertical tested</td>
</tr>
<tr>
<td>HEPS-TF QWR</td>
<td>166.6</td>
<td>2017</td>
<td>Vertical tested</td>
</tr>
</tbody>
</table>
# HERT (FPC couplers)

- More than 60 FPCs have been fabricated
- Capability: ~100 FPC couplers per year

<table>
<thead>
<tr>
<th>Project</th>
<th>Freq. MHz</th>
<th>Power (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEPCII</td>
<td>500</td>
<td>Test: CW, 420 kW Oper.: CW, 150 kW</td>
</tr>
<tr>
<td>C-ADS</td>
<td>325</td>
<td>Test: CW, 10 kW Oper.: CW, 10 kW</td>
</tr>
<tr>
<td>C-ADS</td>
<td>162.5</td>
<td>Test: CW, 10 kW Oper.: CW, 10 kW</td>
</tr>
<tr>
<td>ILC R&amp;D</td>
<td>1300</td>
<td>Test: 1 MW, 1.5 ms, 5 Hz</td>
</tr>
<tr>
<td>C-ADS</td>
<td>325</td>
<td>Test: CW, 105 kW Oper.: CW, 100 kW</td>
</tr>
<tr>
<td>C-ADS</td>
<td>162.5</td>
<td>Oper.: CW, 80 kW</td>
</tr>
</tbody>
</table>
Industry: SRF Cavity (HIT)

Build more 50 cavities
Planning to expanded production
Planning 1000 cavities/year
Lanzhou Ruiyuan Machinery and Equipment Co., Ltd. (LRME) is a private high-tech enterprise founded on the basis of a group working on military technical production. The company is major in the designing and manufacturing of high technology, scientific research and production equipment, such as modern physics equipment, superconductivity, electrical, magnetic and application of ultra high vacuum technology.
Wuxi-inno. for cryostat
Outlook

• Large accelerator projects got a boost in past 2 years, in which most of them are SRF-based.

• SRF R&D were far from enough so far. Domestic SRF industries are limited yet growing steadily.

• New funding for infrastructures and prototyping will help greatly in next few years.

• Fairly long way to go for the new projects. We are at the starting point. Collaborating is essential.