



CEPC Physics and Detector Performance Plan

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1 Mature operation environment

- ▶ Detector-design optimization reflected in benchmark performance updates
- ▶ Realistic conditions: beam background, mis-alignment, noise, non-uniform field **IDRC**
- ▶ Software/MDI coordination, faster background simulation, independent cross-checks

3 AI/QC-powered analysis

- ▶ AI/ML/QC-powered workflows for simulation, selections, tagging and fits **To Publication**
- ▶ AI agents for literature, code, workflow, result and review bookkeeping

2 Physics benchmarks

- ▶ TDR extensions and other physics benchmarks **To Publication**
- ▶ New studies guided by detector-performance impact (e.g. with beam polarization) **To Publication**
- ▶ $H \rightarrow s\bar{s}$ and $Z \rightarrow s\bar{s}$ as one strange-quark benchmark family **IDRC To Publication**

4 Validation with LEP opendata

- ▶ Published LEP-result reproduction as method closure for CEPC-style tagging and fitting
- ▶ New LEP measurements from public legacy-data re-analyses **To Publication**

Physics and Performance Schedule

Time window	Publication path	Supporting work
Within 1 year	TDR-extension studies ready for journal submission: IDRC follow-up, $H/Z \rightarrow s\bar{s}$, benchmark updates	Start realistic-condition and software/MDI/background inputs and cross-checks; define fast-sim benchmark use cases
1–2 years	More LEP opendata results; ML/QC method paper; new physics benchmarks not covered before	Mature detector-design feedback into benchmark updates; advance realistic conditions; deploy AI-agent workflow
3+ years	Integrated CEPC benchmark program: mature detector-informed benchmarks, AI/QC-powered analysis and LEP-validation follow-ups	Production-ready operation: realistic-condition samples, software/MDI cross-checks, reproducible analysis pipeline and review-ready standards