

Prospects of building an accelerator neutrino experiment in China

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on Neutrino Telescopes**

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Introduction

Daya Bay Reactor Neutrino Experiment



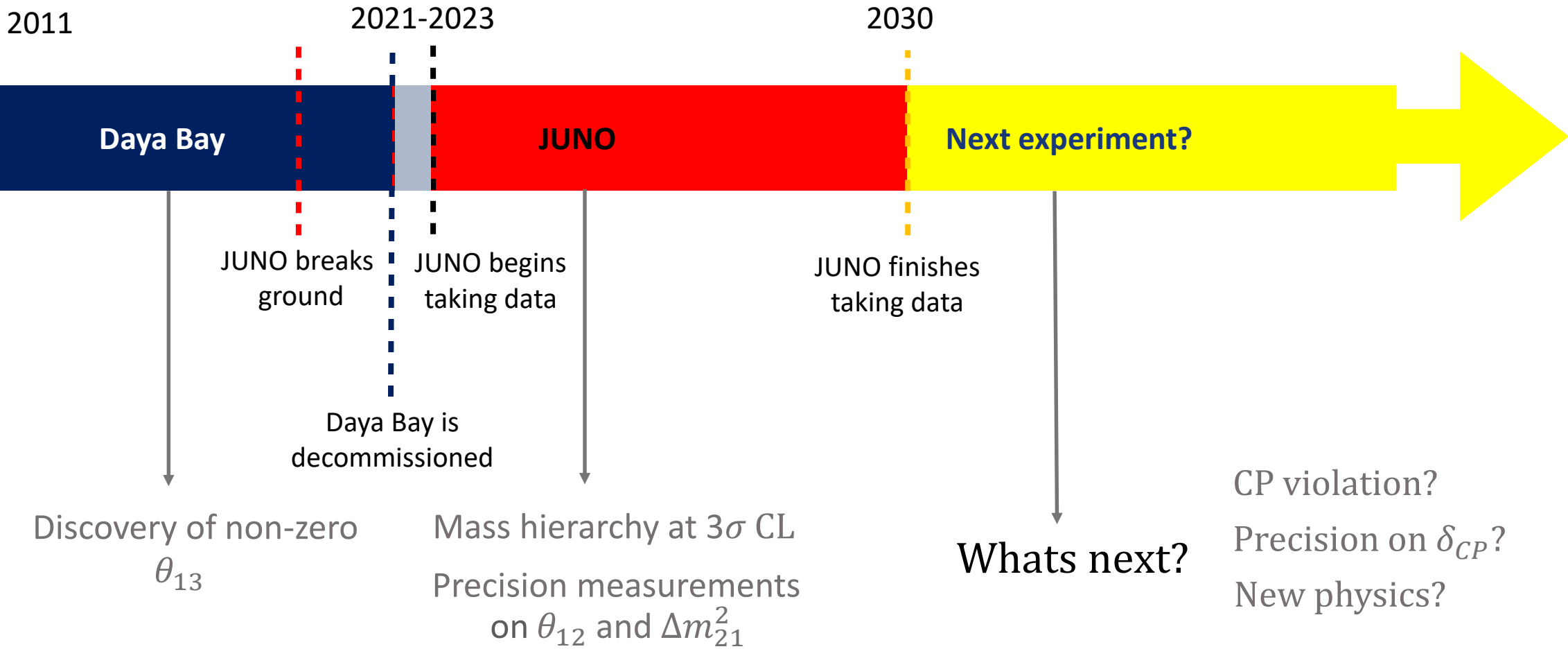
First measurement on mixing angle θ_{13}

Jiangmen Underground Neutrino Observatory

Precision measurements on Δm_{21}^2 and Δm_{31}^2 frequencies



The Roadmap



Research laboratories in China



Accelerator laboratories
Underground laboratories

Research laboratories in China



China Spallation Neutron Source (CSNS)

CSNS

Research laboratories in China



China initiative for Accelerator Driven System (CiADS)

CSNS

CiADS

Research laboratories in China



**Institute of Modern Physics of
the Chinese Academy of
Sciences (CAS-IMP)**

CAS-IMP

CSNS

CiADS

Research laboratories in China



**Proton Linear Accelerator Institute
(Nanjing University)**

CAS-IMP

Nanjing University

CSNS

CiADS

Research laboratories in China



**Super Proton-Proton Collider
(SPPC)**

SPPC

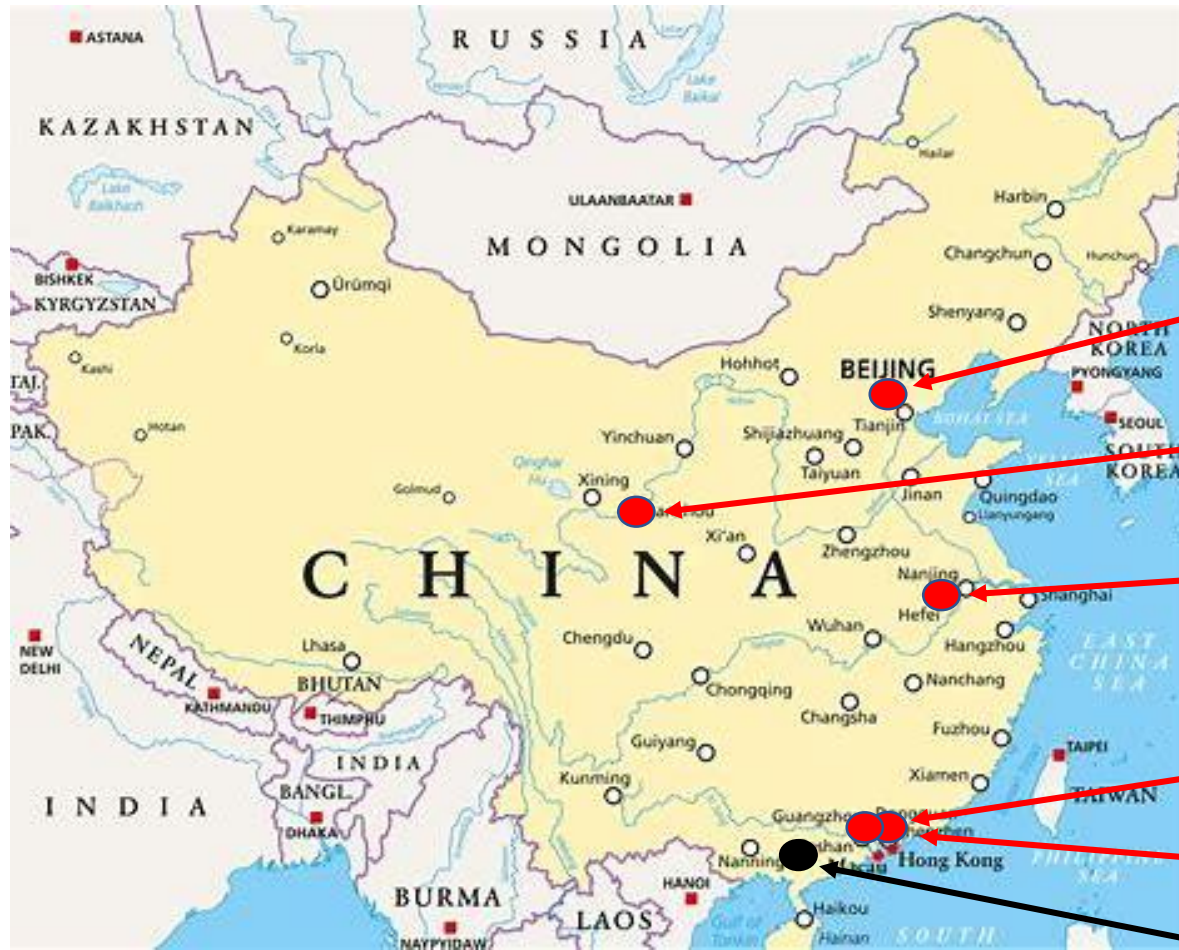
CAS-IMP

Nanjing University

CSNS

CiADS

Research laboratories in China



Jiangmen Underground Neutrino Observatory (JUNO)

SPPC

CAS-IMP

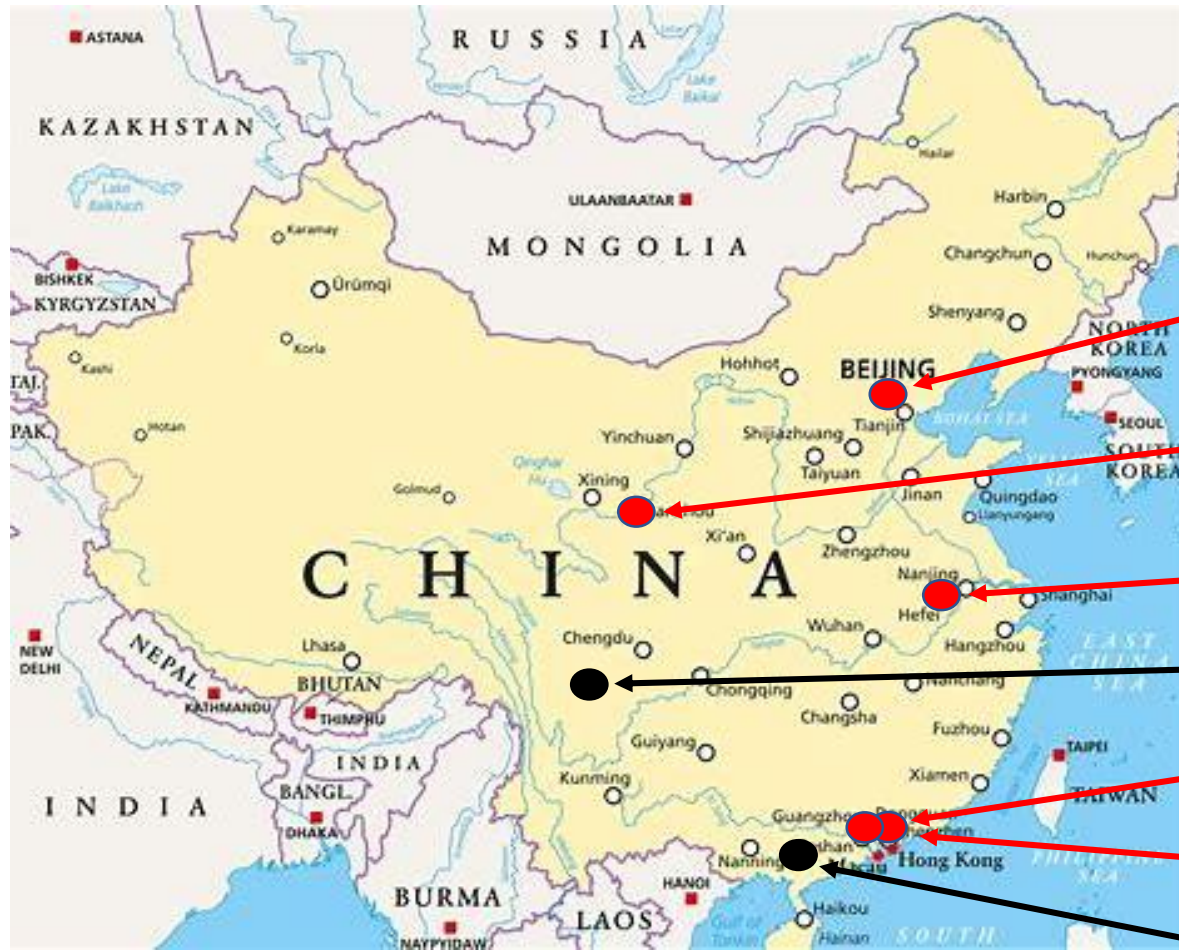
Nanjing University

CSNS

CiADS

JUNO

Research laboratories in China



China JinPing underground Physics Laboratory (CJPL)

SPPC

CAS-IMP

Nanjing University

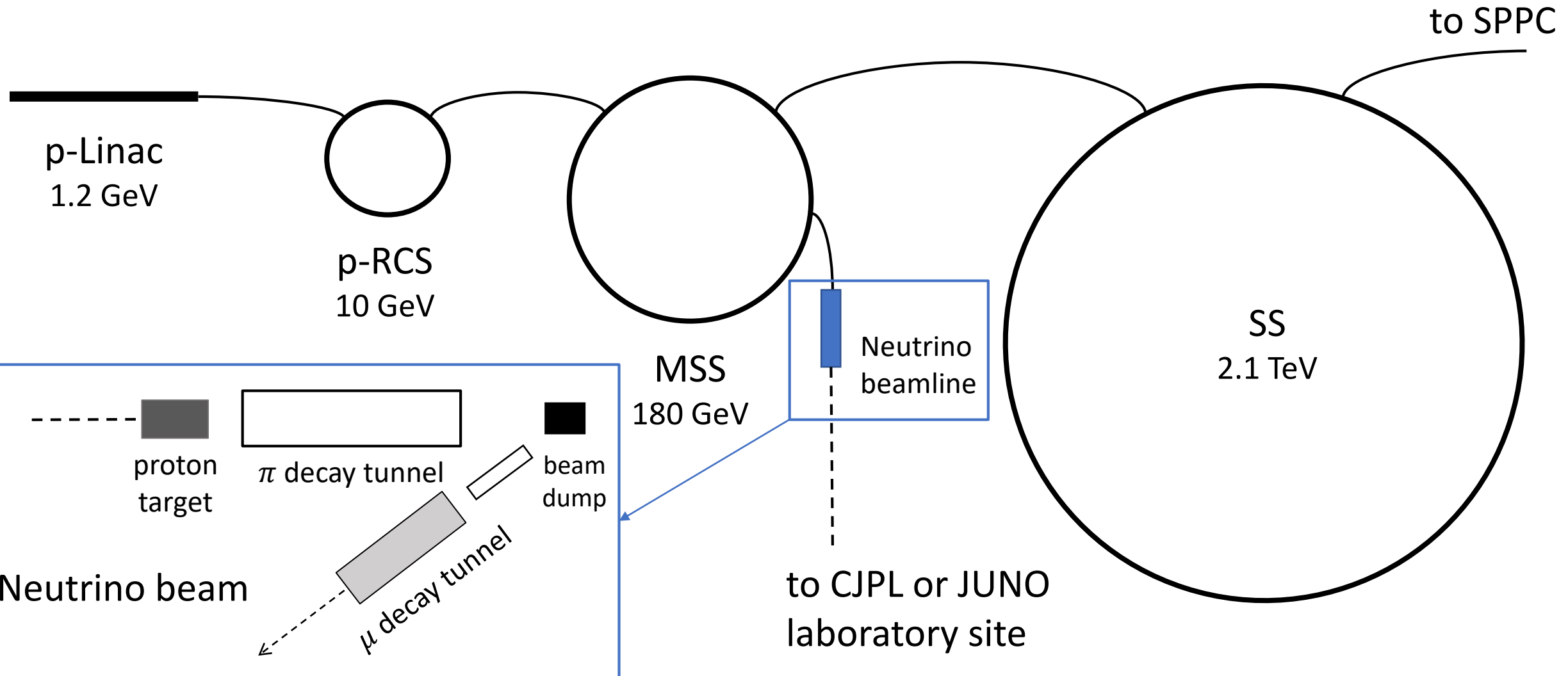
CJPL

CSNS

CiADS

JUNO

Neutrinos from the the SPPC injector chain



Available baseline lengths

The following baseline lengths would be available in these facilities:

	CJPL laboratory site			JUNO laboratory site		
Accelerator facility	Baseline	1st max	2nd max	Baseline	1st max	2nd max
CAS-IMP	894 km	2.7 GeV	600 MeV	1742 km	3.5 GeV	1.2 GeV
CSNS	1329 km	2.8 GeV	900 MeV	84 km	170 MeV	60 MeV
CiADS	1389 km	1.8 GeV	940 MeV	146 km	300 MeV	100 MeV
Nanjing University	1363 km	3.4 GeV	1.1 GeV	1189 km	2.4 GeV	800 MeV
SPPC	1736 km	3.5 GeV	1.2 GeV	1814 km	3.7 GeV	1.2 GeV

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Post-Acceleration Study for Neutrino Super-beam at CSNS
Chin.Phys.C 37 (2013) 9, 097002 [arXiv:1212.5869]

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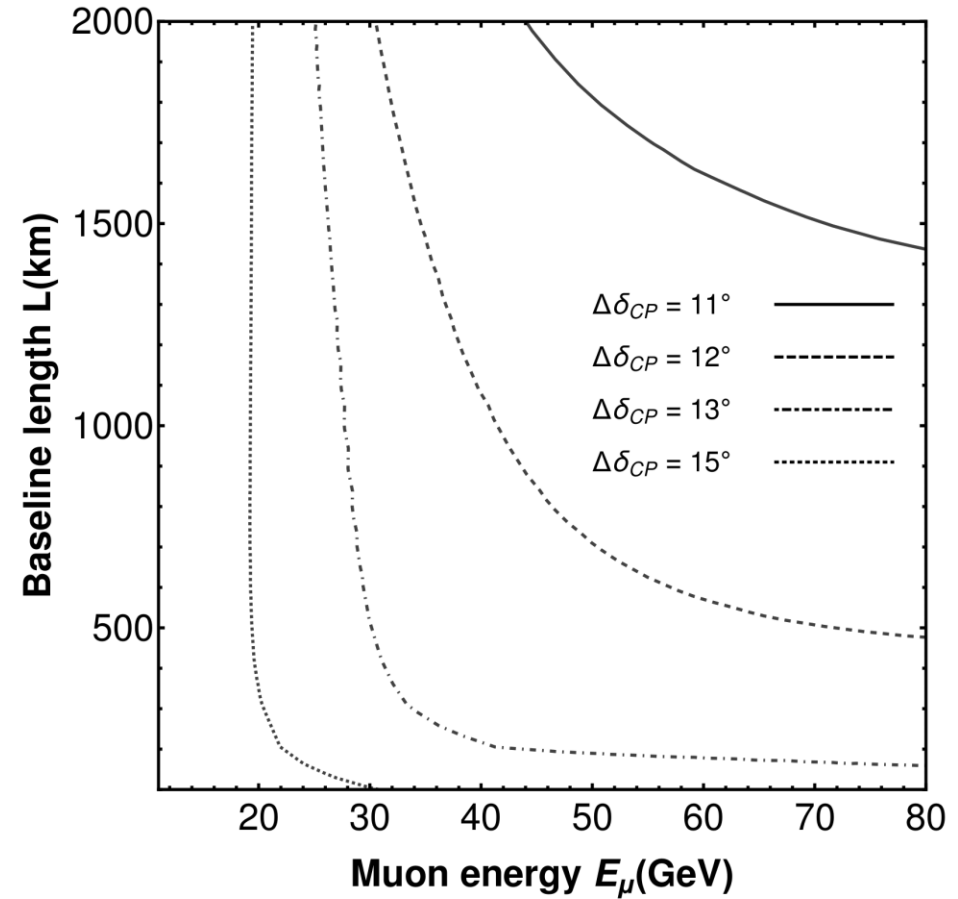
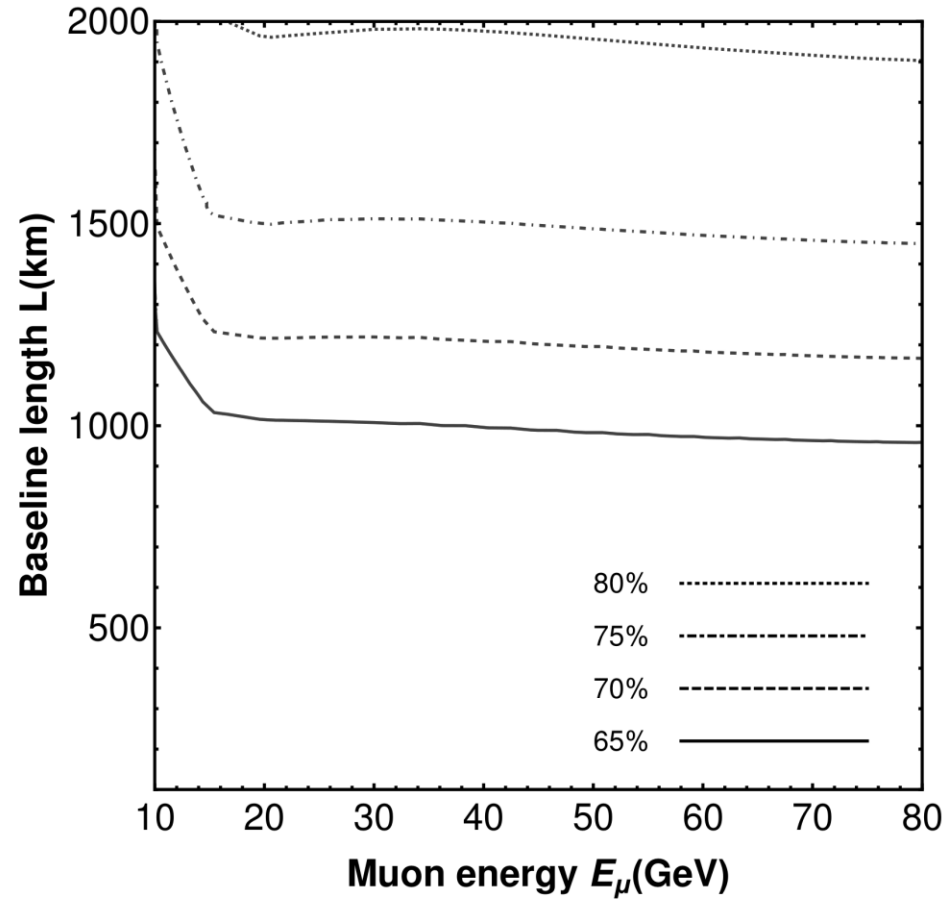
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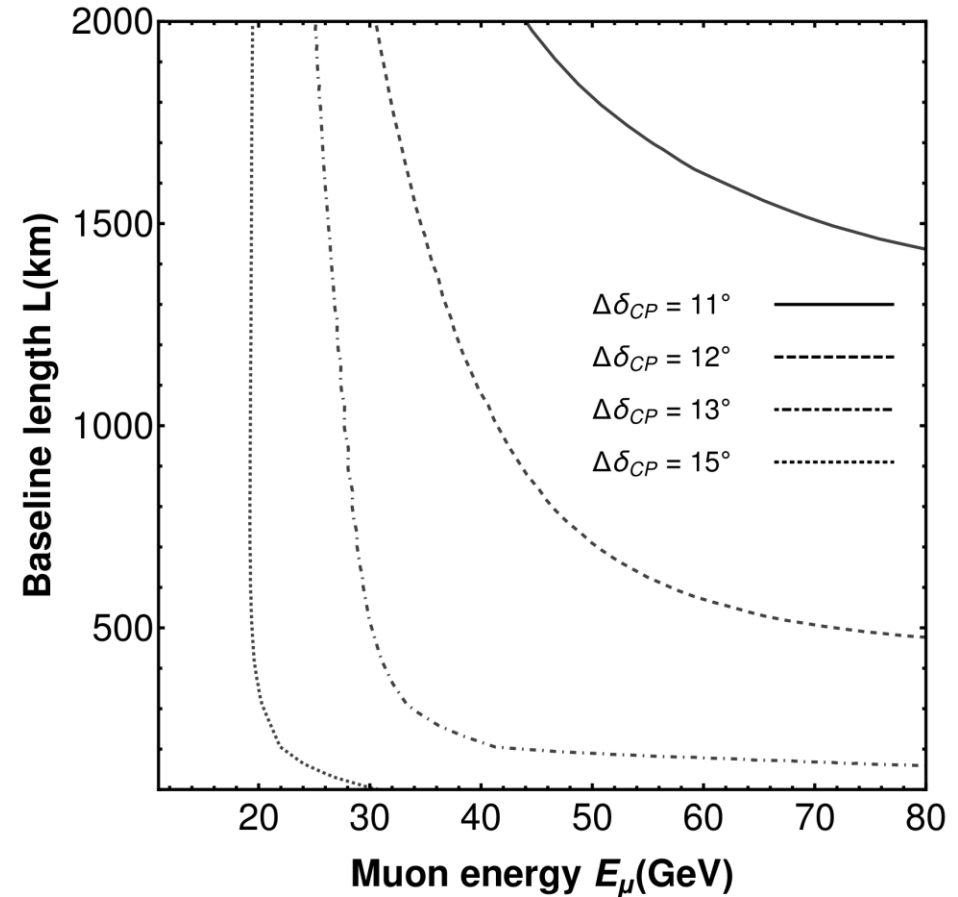
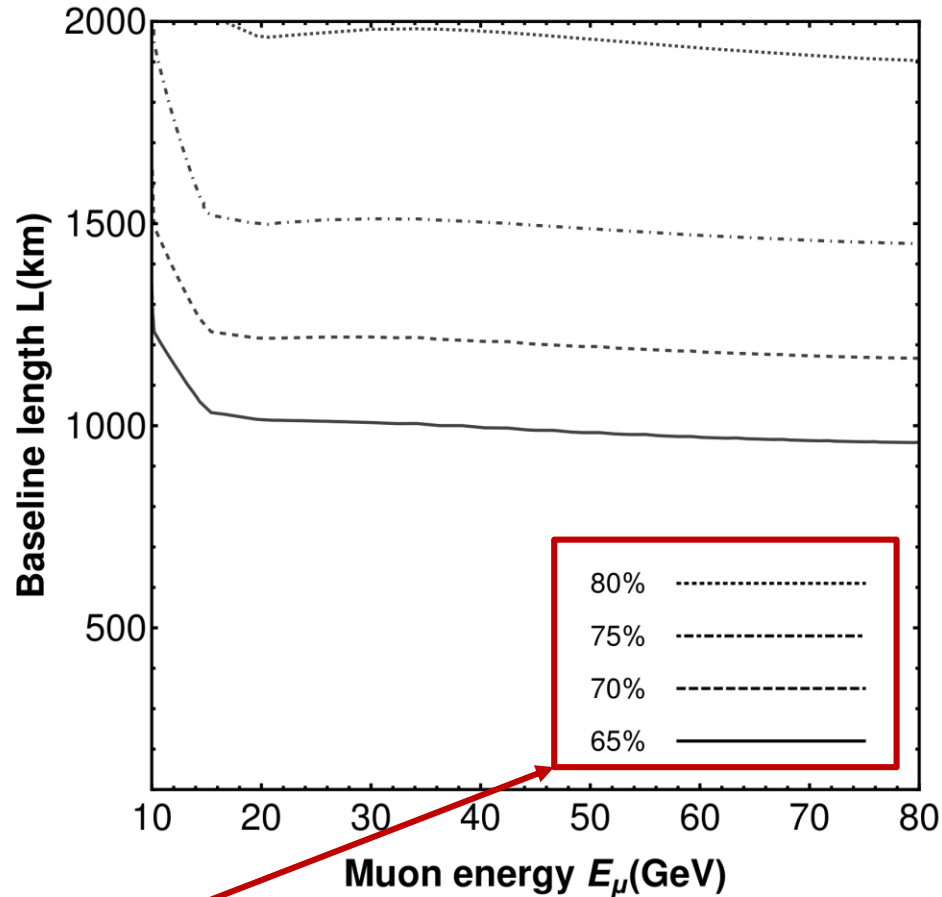
Jun Cao, Miao He, Zhi-Long Hou, Hang-Tao Jing and Yu-Feng Li,
Muon-decay medium-baseline neutrino beam facility,
Phys.Rev.ST Accel.Beams 17 (2014) 090101 [arXiv:1401.8125]

MOMENT

CP violation and precision on δ_{CP}

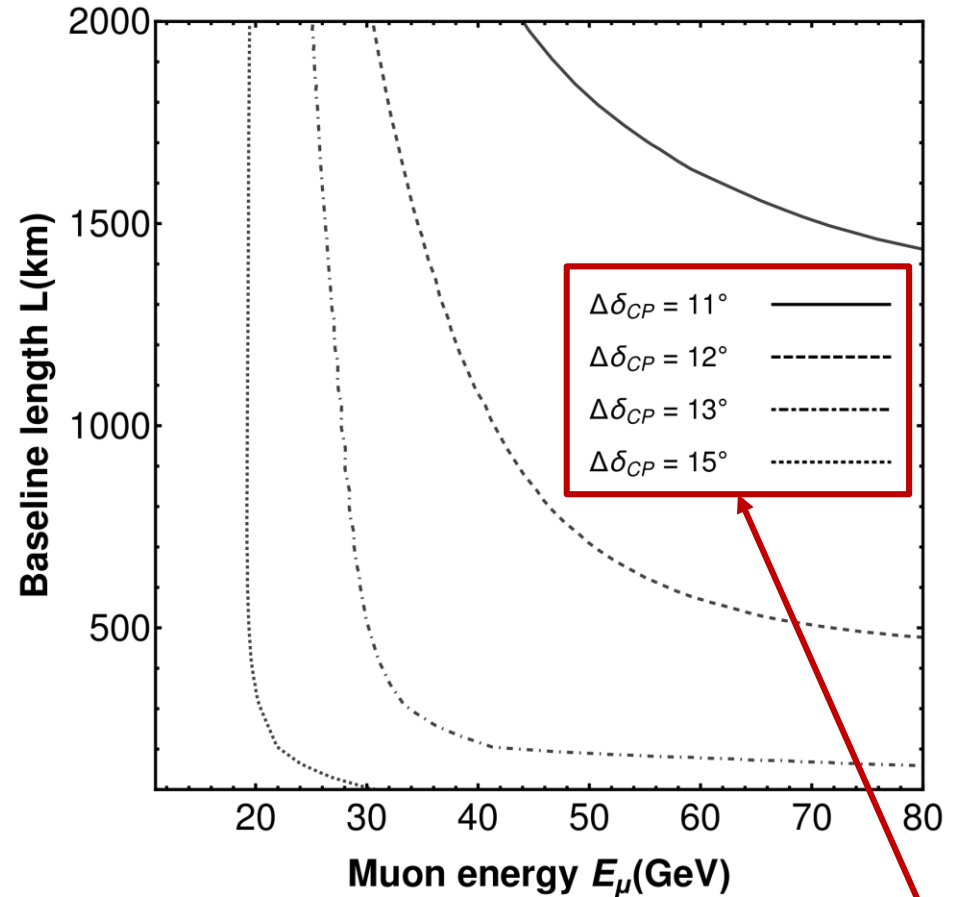
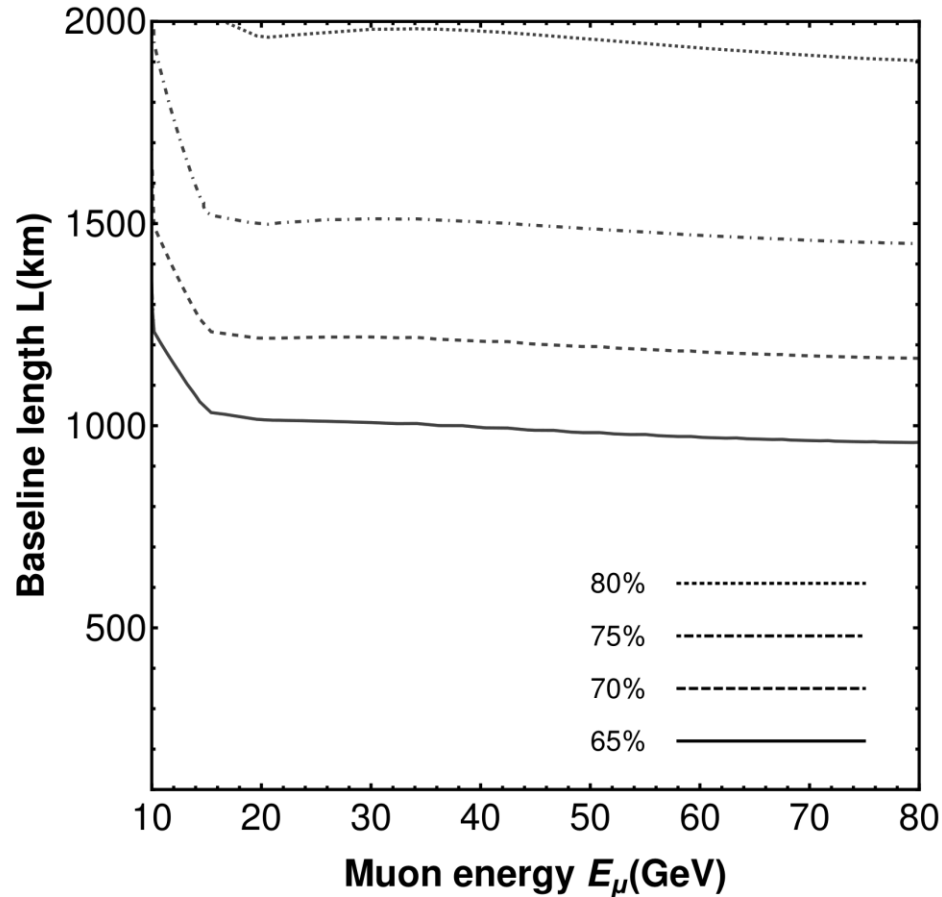


CP violation and precision on δ_{CP}



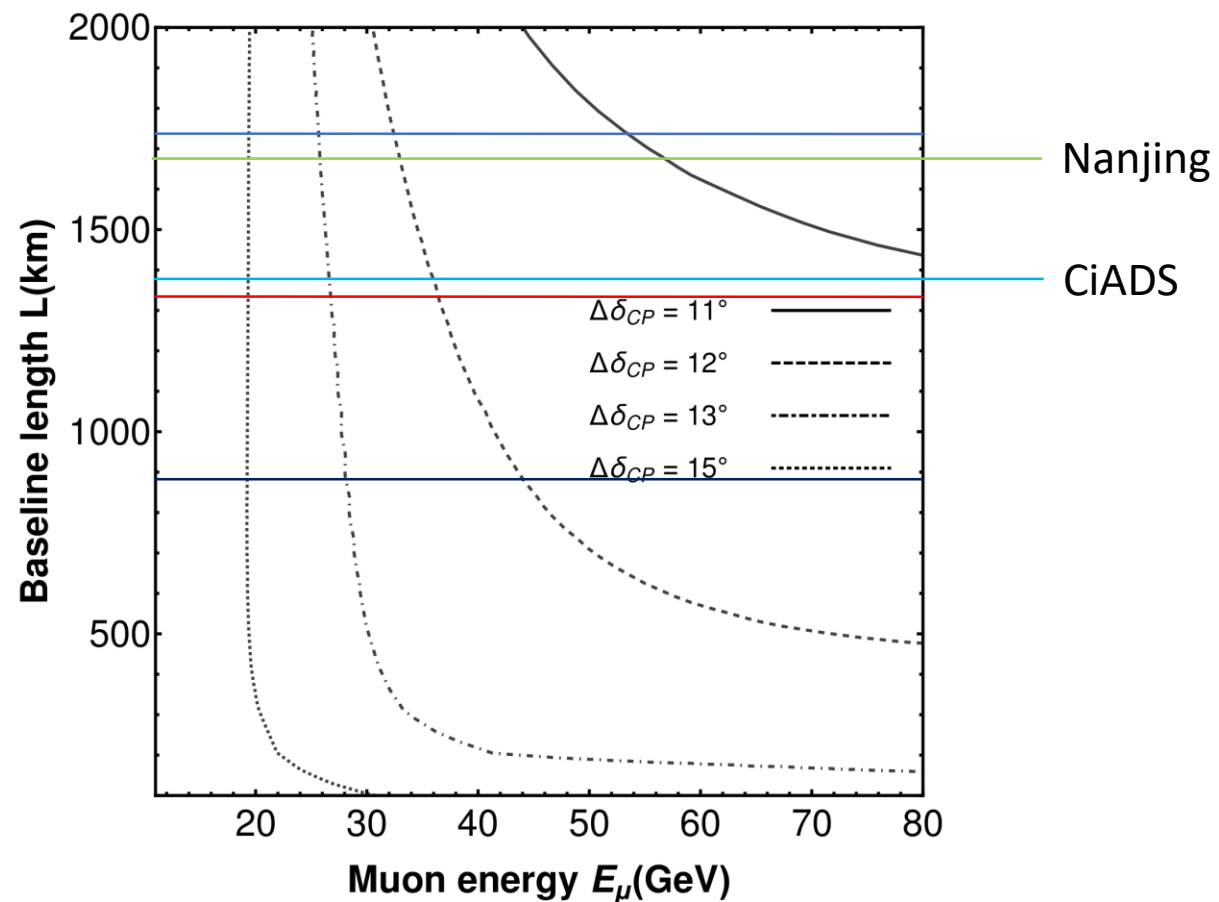
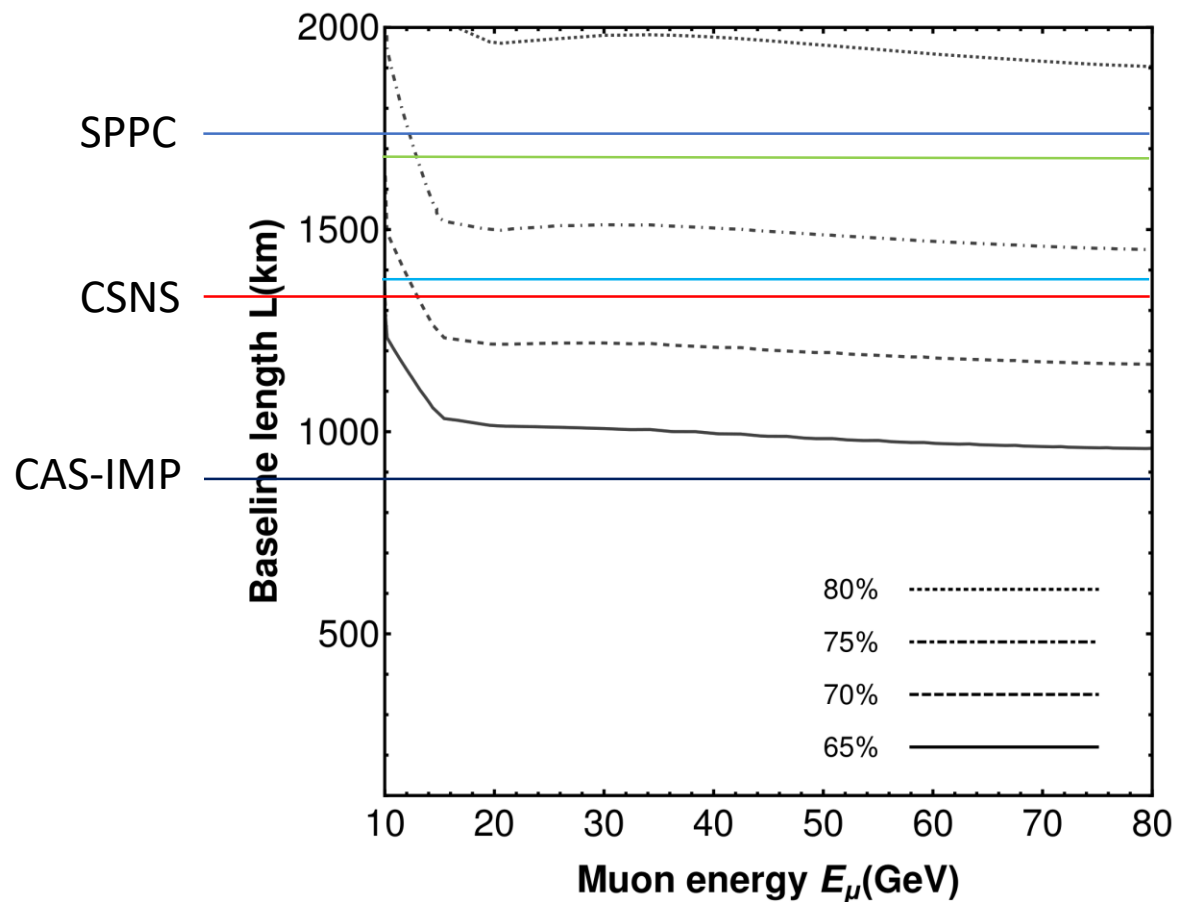
Fraction of δ_{CP} values at which CP violation can be established by more than 3σ CL.

CP violation and precision on δ_{CP}



Precision on δ_{CP} at 1σ CL.

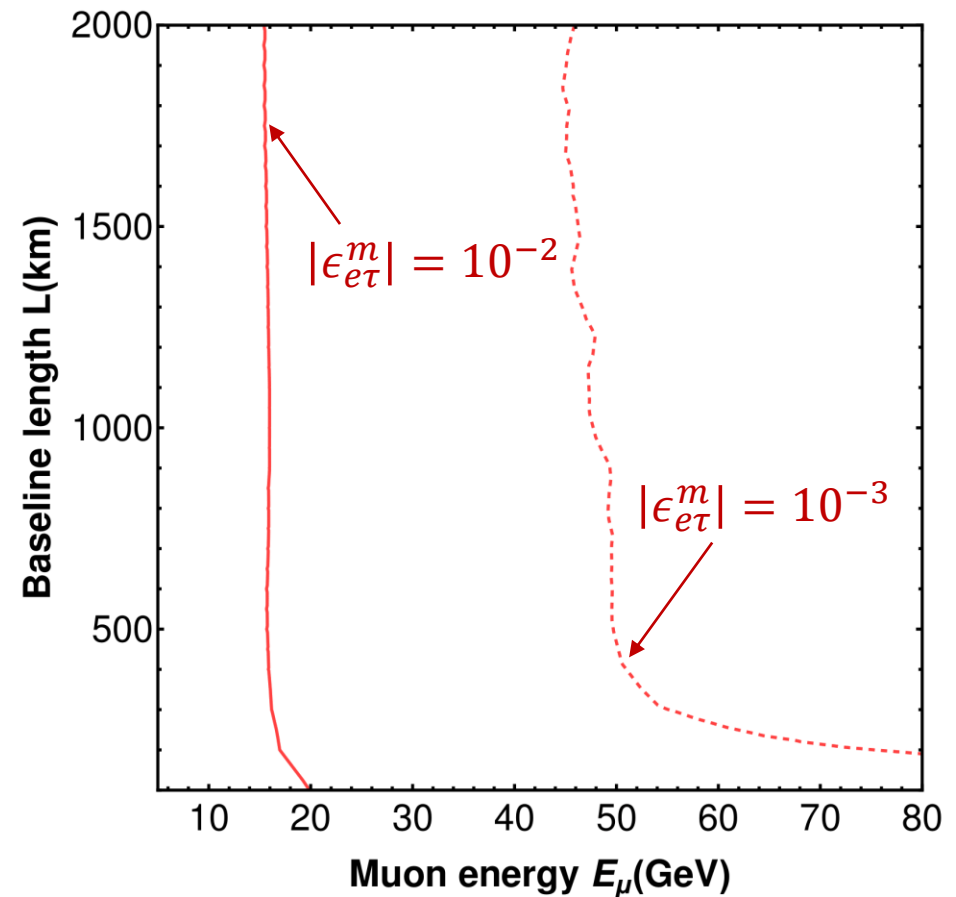
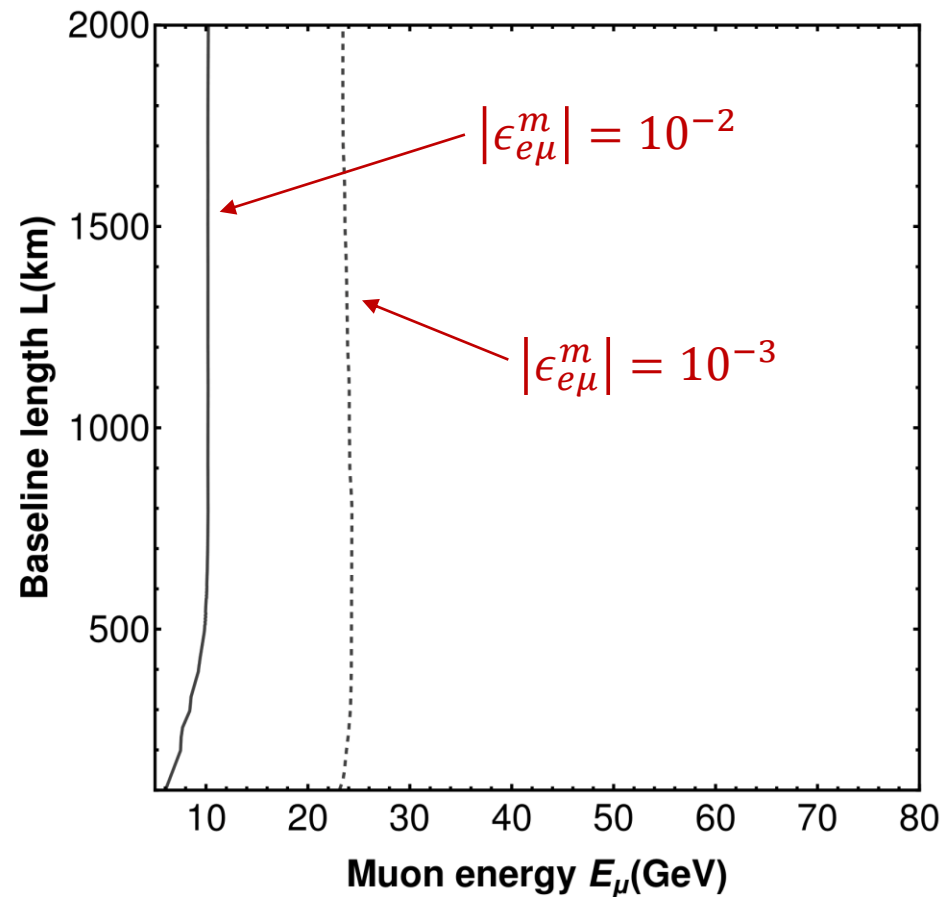
CP violation and precision on δ_{CP}



Detector location: China JinPing Laboratory (CJPL)

New Physics searches

Sensitivity to non-standard neutrino interactions:



Summary

- The near future of neutrino oscillation physics will be marked by ***precision measurements*** and searches for ***new physics***
- There is a good reason to consider building an accelerator-based neutrino oscillation experiment in mainland China
- In our work, the feasibility of constructing such experiment is studied considering the synergies between the existing infrastructure



Thank you for listening!