

# **The 2022 Shanghai Particle Physics and Cosmology Symposium: Neutrino and Dark Matter Physics (SPCS 2022)**

Friday, 18 November 2022 - Sunday, 20 November 2022

## **Book of Abstracts**



# Contents

DM Direct 1 . . . . .	1
Recent status and prospects of CDEX@CJPL . . . . .	1
Dark Matter Search Results of PandaX . . . . .	1
The Weakly Interacting Massive Particle dark matter and beyond . . . . .	1
Cosmic ray boosted dark matter . . . . .	1
Recent developments in search for light dark matter . . . . .	1
Search for the Absorption of Sub-MeV Fermionic Dark Matter on Electron Targets with the PandaX-4T Run 1 Data . . . . .	1
Detecting ultra-light particles from astro-physical observations . . . . .	1
The Resonant Cavity Search for Axion Dark Matter . . . . .	2
Quantum interferometry and axion haloscope . . . . .	2
Search for Dark Matter and Fifth Force with Coupled Hot Atom Ensembles . . . . .	2
Experimental Limits on Exotic Spin and Velocity Dependent Interactions Using Rotationally Modulated Source Masses and an AtomicMagnetometer Array . . . . .	2
DM Ultralight 2 . . . . .	2
Novel cosmological bounds on thermally-produced axion-like particles . . . . .	2
Opening . . . . .	2
Registration . . . . .	3
Neutrino Physics at Daya Bay and JUNO . . . . .	3
Neutrino Oscillation Experiments . . . . .	3
The Status of Jinping Neutrino Experiment . . . . .	3
CDEX-300v program for Ge-76 $0\nu\beta\beta$ search at CJPL . . . . .	3
Direct Neutrino Mass Measurement and Relic Neutrino Detection with PTOLEMY . . . . .	3
Quest for the absolute neutrino mass . . . . .	3

Sterile Neutrinos: Fact and Fiction . . . . .	3
Theoretical perspective on flavor structure of SM . . . . .	3
CDEX-300v program for Ge-76 $0\nu\beta\beta$ search at CJPL . . . . .	4
Jinping bolometric experiment for neutrinoless double beta decay search . . . . .	4
NvDEx experiment . . . . .	4
Neutrino Mass 2 . . . . .	4
Parallel Sessions . . . . .	4
DAMPE 的研究现状及 VLAST 的研发进展 . . . . .	4
AMS 实验暗物质寻找 . . . . .	4
In Search of Cosmic-Ray Anti-nuclei from Dark Matter with the GAPS Experiment . . . . .	5
Recent progresses on the astrophysical probe of dark matter . . . . .	5
Probing for an ultralight dark photon from inverse Comptonlike scattering . . . . .	5
Searching for dark matter with x-ray lines . . . . .	5
Search for dark matter alternative to WIMPs . . . . .	5
中微子宇宙学 . . . . .	5
Dark matter and the symmetry breaking in the early Universe . . . . .	5
Testability of thermal leptogenesis . . . . .	5
Type II seesaw leptogenesis . . . . .	6
Dark Matter Detection with Gravitational Waves: from Ultralight to Ultraheavy . . . . .	6
Exploring the Blazar-boosted dark matter at XENON1T and SuperKamiokande . . . . .	6
Effective field theory approach to neutrinoless double beta decay with light sterile neutrinos . . . . .	6
Muon Physics Possibilities at the Shanghai SHINE facility . . . . .	6
Measurement of $^{136}\text{Xe}$ DBD Half-life with PandaX-4T . . . . .	6
Closing Remark . . . . .	6
XENONnT Progress . . . . .	6
Forbidden Dark Matter Combusted Around Supermassive Black Hole . . . . .	7
Light Fermionic Dark Matter Absorption on Electron Targets . . . . .	7
Can sub-GeV dark matter coherently scatter on the electrons in the atom? . . . . .	7
WIMP dark matter hidden behind its companion . . . . .	7

Realistic scattering of puffy dark matter . . . . .	7
Revisiting Dark Matter Freeze-in and Freeze-out through Phase-Space Distribution . . . . .	7
Probing sub-GeV leptophilic dark matter at Belle II and NA64 . . . . .	7
Boosted DM . . . . .	7
Improving neutrino CP measurement with muon-decay-at-rest . . . . .	8
CEvNS at CSNS in China . . . . .	8
Effects of Quasi-elastic and Deep-inelastic Scattering in Light Dark Matter Direct Detection . . . . .	8
Monojet search for heavy neutrinos at future $Z$ -factories . . . . .	8
The Scattering of Dirac and Majorana Fermions by Kerr spacetime in the teleparallel gravity approach . . . . .	8
Probing Millicharged particles via collision between cosmic ray and atmosphere . . . . .	8
Axion dark radiation: Hubble tension and the Hyper-Kamiokande neutrino experiment . . . . .	8
New window for post-inflationary axion DM . . . . .	9



28

## **DM Direct 1**

Session 1 / 29

### **Recent status and prospects of CDEX@CJPL**

Session 1 / 30

### **Dark Matter Search Results of PandaX**

Session 1 / 31

### **The Weakly Interacting Massive Particle dark matter and beyond**

Session 2 / 32

### **Cosmic ray boosted dark matter**

Session 2 / 33

### **Recent developments in search for light dark matter**

Session 2 / 34

### **Search for the Absorption of Sub-MeV Fermionic Dark Matter on Electron Targets with the PandaX-4T Run 1 Data**

Session 3 / 35

### **Detecting ultra-light particles from astro-physical observations**

Session 3 / 36

## **The Resonant Cavity Search for Axion Dark Matter**

Session 3 / 37

## **Quantum interferometry and axion haloscope**

Session 4 / 38

## **Search for Dark Matter and Fifth Force with Coupled Hot Atom Ensembles**

Session 4 / 39

## **Experimental Limits on Exotic Spin and Velocity Dependent Interactions Using Rotationally Modulated Source Masses and an Atomic Magnetometer Array**

Session 4 / 40

## **DM Ultralight 2**

Session 4 / 41

## **Novel cosmological bounds on thermally-produced axion-like particles**

42

## **Opening**

Online Meeting Room: <https://meeting.tencent.com/dm/5ZXTYke8Xhp7>

ID: 599383871

Password: 955050

**Paper Info:**



43

## **Registration**

Session 1 / 44

## **Neutrino Physics at Daya Bay and JUNO**

Session 1 / 45

## **Neutrino Oscillation Experiments**

Session 1 / 46

## **The Status of Jinping Neutrino Experiment**

Session 2 / 47

## **CDEX-300v program for Ge-76 $0\nu\beta\beta$ search at CJPL**

Session 2 / 48

## **Direct Neutrino Mass Measurement and Relic Neutrino Detection with PTOLEMY**

Session 2 / 49

## **Quest for the absolute neutrino mass**

Session 3 / 50

## **Sterile Neutrinos: Fact and Fiction**

Session 3 / 51

## **Theoretical perspective on flavor structure of SM**

Session 4 / 52

### **CDEX-300v program for Ge-76 $0\nu\beta\beta$ search at CJPL**

Session 4 / 53

### **Jinping bolometric experiment for neutrinoless double beta decay search**

Session 4 / 54

### **NvDEX experiment**

Paper Info:

Session 4 / 55

### **Neutrino Mass 2**

56

## **Parallel Sessions**

Online Meeting Room: <https://meeting.tencent.com/dm/eWRvvsyTHzsg>  
ID:625827863  
Password: 678061

Session 1 / 57

### **DAMPE 的研究现状及 VLAST 的研发进展**

Session 1 / 58

### **AMS 实验暗物质寻找**

**Session 1 / 59**

## **In Search of Cosmic-Ray Anti-nuclei from Dark Matter with the GAPS Experiment**

**Session 2 / 60**

## **Recent progresses on the astrophysical probe of dark matter**

**Session 2 / 61**

## **Probing for an ultralight dark photon from inverse Comptonlike scattering**

**Session 2 / 62**

## **Searching for dark matter with x-ray lines**

**Session 3 / 63**

## **Search for dark matter alternative to WIMPs**

**Session 3 / 64**

## **中微子宇宙学**

**Session 3 / 65**

## **Dark matter and the symmetry breaking in the early Universe**

**Session 4 / 66**

## **Testability of thermal leptogenesis**

Session 4 / 67

## **Type II seesaw leptogenesis**

Session 4 / 68

## **Dark Matter Detection with Gravitational Waves: from Ultralight to Ultraheavy**

Session 4 / 69

## **Exploring the Blazar-boosted dark matter at XENON1T and SuperKamiokande**

Session 3 / 71

## **Effective field theory approach to neutrinoless double beta decay with light sterile neutrinos**

Session 2 / 74

## **Muon Physics Possibilities at the Shanghai SHINE facility**

Corresponding Author: kimsiang84@sjtu.edu.cn

Paper Info:

Session 4 / 75

## **Measurement of $^{136}\text{Xe}$ DBD Half-life with PandaX-4T**

76

## **Closing Remark**

Parallel Sessions-会议室 1 / 77

## **XENONnT Progress**

Parallel Sessions-会议室 1 / 78

### **Forbidden Dark Matter Combusted Around Supermassive Black Hole**

Parallel Sessions-会议室 1 / 79

### **Light Fermionic Dark Matter Absorption on Electron Targets**

Parallel Sessions-会议室 1 / 80

### **Can sub-GeV dark matter coherently scatter on the electrons in the atom?**

Parallel Sessions-会议室 1 / 81

### **WIMP dark matter hidden behind its companion**

Parallel Sessions-会议室 1 / 82

### **Realistic scattering of puffy dark matter**

Parallel Sessions-会议室 1 / 83

### **Revisiting Dark Matter Freeze-in and Freeze-out through Phase-Space Distribution**

Parallel Sessions-会议室 1 / 84

### **Probing sub-GeV leptophilic dark matter at Belle II and NA64**

Parallel Sessions-会议室 1 / 85

## **Boosted DM**

Parallel Sessions-会议室 2 / 86

## **Improving neutrino CP measurement with muon-decay-at-rest**

Parallel Sessions-会议室 2 / 87

## **CEvNS at CSNS in China**

Parallel Sessions-会议室 2 / 88

## **Effects of Quasi-elastic and Deep-inelastic Scattering in Light Dark Matter Direct Detection**

Parallel Sessions-会议室 2 / 89

## **Monojet search for heavy neutrinos at future $Z$ -factories**

Parallel Sessions-会议室 2 / 90

## **The Scattering of Dirac and Majorana Fermions by Kerr space-time in the teleparallel gravity approach**

Parallel Sessions-会议室 2 / 91

## **Probing Millicharged particles via collision between cosmic ray and atmosphere**

Parallel Sessions-会议室 2 / 92

## **Axion dark radiation: Hubble tension and the Hyper-Kamiokande neutrino experiment**

**Parallel Sessions-会议室 2 / 93**

## **New window for post-inflationary axion DM**