

The White Paper

- Title: White Paper on New Opportunities at the Next Generation Neutrino Experiments
 - Subtitle: Part 1: Dark Matter and BSM Involving Neutrinos
- What is this white paper for?
 - Document the work we have done here
 - Establish the benchmark on
 - Where we are with the two themed BSM areas?
 - Where do we want to go with them and when?
 - What do we need to do to enable us to do this physics on Day1?
 - Make sure this become part of the next Snowmass doc
 - This group should form the core of the DPF BSM@Nu NG Experiments working group



White Paper Structure

1. Introduction (0.5 pages) – AG, AS, JY
2. Landscape on Beyond the Standard Model Physics at Neutrino Experiment (2 pages) – Shoemaker, Cui
3. BSM Physics Results in Current Neutrino Experiments (2pages) – Tsai, Thomas
4. The Next Generation Neutrino Experiment and Their Capabilities (1.5 pages) – Bishai, Jones
5. BSM Prospects at the NG neutrino Experiments (6 pages) – Machado, Batell
6. Tasks and Timelines to support accomplishing the prospective results (1 – 1.5 pages) – Berger, Batell, de Roeck, Sousa, Yu
7. Conclusions (0.5 pages) – AG
8. Bibliography



White Paper on New Opportunities at the Next Generation Neutrino Experiments
(Part 1: Dark Matter and BSM involving Neutrinos)

Date

List of Authors

Executive Summary

Preamble (1 – 2 paragraphs) – [AS](#), [AG](#), [JY](#)

1. Introduction (0.5 pages) – [AG](#), [AS](#), [JY](#)

2. Landscape on Beyond the Standard Model Physics at Neutrino Experiment (2 pages) –
[Shoemaker](#), [Cui](#)

3. BSM Physics Results in Current Neutrino Experiments (2pages) – [Tsai](#), [Thomas](#)

4. The Next Generation Neutrino Experiment and Their Capabilities (1.5 pages) – [Bishai](#), [Jones](#)

3.1. Liquid Argon Detector Experiments

3.2. Cerenkov Detector Experiments

3.3. Scintillator Detector Experiments

5. BSM Prospects at the NG neutrino Experiments (6 pages) – [Machado](#), [Batell](#)

5.1 BSM Physics Tools and Prospect for Future Improvements – [Berger](#), [Shoemaker](#)

5.2 Dark Matter Searches – [Kim](#), [Park](#), [Chatterjee](#), [Tsai](#)

5.2.1. Low Mass Dark Matter Searches

5.2.2. Boosted Dark Matter Searches

5.2.3. Other DM searches

5.3 BSM with Neutrinos – [Machado](#), [Aurisano](#), [Sousa](#)

5.3.1. Sterile Neutrino searches

5.3.2. Non-Standard Neutrino Interactions

5.3.3. Non-unitarity

5.3.4. CPT/Lorentz Violations

5.3.5. Trident searches

5.3.6. Large Extra Dimensions

5.3.7. BSM with ν_τ

6. Tasks and Timelines to support accomplishing the prospective results (1 – 1.5 pages) – [Berger](#),
[Batell](#), [de Roeck](#), [Sousa](#), [Yu](#)

7. Conclusions (0.5 pages) – [AG](#)

8. Bibliography



White Paper Organization and Timeline

- Overleaf area has been established:
<https://www.overleaf.com/7442974761cgkphcsknkrv>
- Each group works on writing in this session through the end of it
- We will close the workshop at the end of the morning session but each group can continue writing through the lunch and the afternoon
 - CPB303, CPB347, CPB126 and CPB 3rd floor HEP area available for writing
- The draft at the end of today will be taken as a solid draft to start the iteration
- 4/14 – 4/21/19: AG, AS and JY will clean it up; add executive summary and circulate for your perusal by the end of next week
- 4/21 – 4/28/19: All participants comment on the version
- 4/28 – 5/1/19: Section leaders reflect the comments
- 5/5/19: AG, AS and JY finalize and submit to Archive

Saturday, Apr. 13, 2019



New Opportunities..., Jae Yu

Planetarium Special at 12:30pm

Phantom of the Universe

Saturday, Apr. 13, 2019



New Opportunities..., Jae Yu

5