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NF03 – BSM Report

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Nov. 12, 2020

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The scope: Focus on searches for signals from BSM physics involving neutrinos and accessible using neutrino facilities in both from a theoretical and experimental perspective



NF03 Vision on Whitepapers

- Each sub-topical group generates one whitepaper, supported by detailed studies
 - One whitepaper for each sub-topical group, that encompasses all relevant frontiers and in conjunction w/ other groups
 - Encourage synergy between similar topics
 - Promote new ideas out of the existing ones
 - Give input to facilities to prepare to meet the BSM needs in the next 10 – 15 yrs
 - Provide strong physics justifications to the planning document, with associated timeline → Does not mean to be a self-contained paper
 - Good and coherent collection of references and physics justifications
 - Relevance to the planning for future
- Parts of these whitepapers make up the NF03 contributions to the Snowmass planning document
- Expect sub topical group whitepaper may be released to Archive and subsequent publication depends on the groups' wishes
 - Whitepapers are not in place of individual's publications



NF03 Sub-topical Groups and the Leads

- Sub-topical groups formed based on submitted LOI's @ <https://www.snowmass21.org/neutrino/bsm/start>
- Heavy Neutral Leptons: I. Shoemaker, A. de Roeck
 - Coordinate with NF02
- Coherent Elastic Neutrino-Nucleus Scattering: L. Strigari, P. Barbeau, R. Strauss
- BSM searches within neutrino oscillations: P. Coloma, D. Forero, T. Katori
 - Covers Large Extra Dimension searches, Lorentz and CPT symmetry, Non-unitarity of the neutrino mixing matrix, Non-standard interactions, etc
 - Coordinate with NF01 & NF02
- Baryon number violation: B. Dev, L. Koerner
 - Coordinate with RF04 and any related CPM groups
- Cosmogenic dark matter and exotic particle searches: D. Kim, Y. Tsai
 - Coordinate with CPM97
- Beam-originating dark matter candidate searches: B. Batell, J. Yu
 - Coordinate with CPM108
- Subtopical groups started their own organization



NF03 Whitepaper Timeline

- NF Whitepaper kick off meeting: Nov/Dec, 2020 (?)
- 2/24 – 2/27/2021: Mid-way check point joint workshop
 - Good draft sub-topical group whitepapers (= < 50 pages)
 - Presentations of the status of sub-topical groups and remaining studies with timelines
 - Skeleton draft of NF03 whitepaper
- 3/15 – 3/27/2021: NF workshop
 - Outline of NF03 whitepaper to be included in the NF summary
 - Must contain key questions and opportunities in BSM@nu
- 4/30/2021
 - Delivery of the final version of the sub-topical group white papers to NF03 conveners
- May – June, 2021: Preliminary Frontier Reports and community FB
- 7/11 – 7/17/2021: Snowmass summer study
 - Build consensus on key opportunities and priorities
 - Reflect FB and finalize the NF03 Whitepaper (5 – 10 pages)
- Oct. 2021: Final Snowmass report

Thursday, Nov. 12, 2020



NF03 BSM@nu update
Jaehoon Yu

“Potential F2F” Joint Workshop

- A joint meeting with NF01, NF02, NF03, RF06, TF11 and any other interested groups
- Workshop dates: Wed., Feb. 24 – Sat. Feb. 27, 2021
 - If fully online, Wednesday (2/24) – Friday (2/26)
- Host: University of Pittsburgh
- Format of the workshop
 - Plan on hybrid in-person or fully online meeting
 - Monitor COVID – 19 situation through as late a stage as possible and make a decision – Likely to be mid Jan. 2021
- Suggested scope: New Physics Opportunities at Neutrinos in Theoretical and Experimental Perspectives
- Two organizing committees – LOC and POC

