

Snowmass 2013:

New Light, Weakly Coupled Particles

(NLWCP)

Conveners:

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Why are we here?

Aim of Snowmass 2013

- initiated by APS's Division of Particles and Fields
- **Aim:** develop high-energy physics community's long-term goals and aspirations
- **Outcome:** communicate these to the broader scientific community and the government

Charge to Argonne workshop

- Develop coherent and interconnected view of Intensity Frontier that will be presented at Snowmass
- Describe future facilities, experiments, & their capabilities
- How does IF contribute to addressing major questions in particle physics and explain how and why it is complementary to the other frontiers
- Leave workshop with a clear understanding of what the approach will be at Snowmass 2013

Topics of NLWCP

- axions
- axion-like particles (ALPs)
- dark photons
- chameleons

+ anything else that is new, light and weakly-coupled...
(e.g. light DM particles, light scalars...)

common theme: probe at facilities that have high intensity beams of electrons, protons, or photons

Why NLWCP is important

- particles are motivated from e.g.
 - dark matter
 - theory, e.g. strong CP problem
 - dark energy
 - anomalies, e.g. muon $g-2$ and astrophysical

(clear need to coordinate w/ Cosmic Frontier subgroup)
- planned experiments offer incredible pay-off if they find something, for relatively small investment

Our group's goals

- Similar to Intensity Frontier workshop 12/2011 (1205.2671)
- Update physics case, constraints, and planned experiments...
- But additional important focus:
 - How improve future searches, what facilities are needed, where can field be 10-20 years?
 - Important *physics* questions!
- As a small group, need to highlight why our physics is important

Produce a summary document

Timeline of summary reports

~30-pages

- First drafts by July 1, 2013
- Final drafts at start of Snowmass

In addition:

- 5 page subgroup summaries (used as input for 30 page IF summary) by start of Snowmass

Questions from Cosmic Frontiers for us

(perhaps more to come?)

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In light of that fact, is there a motivated parameter space to aim for?

Does it make sense to look at a next generation of experiments?”

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(statement also needs clarification)

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Of course.

DM is not the only motivation for these searches!

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- July 1, 2013: Draft of 30-page Summary
- July 29 - August 6, 2013: Snowmass 2013 - present our subgroup to others & coordinate w/ other frontiers

**Thank you all for
coming & contributing!**