

Virginia Tech Virtual Town Hall Participant Questions

Please provide the topic/speaker your question is addressed to, and we encourage you to provide your name, institution, and email address so we may follow-up with you if needed. If your question does not get answered during the session, we will work to have it answered subsequently. Thank you!

E.g. first name, last name, email address, speaker name: comment/question

All submissions to this document are governed by the [Code of Conduct for APS Meetings](#)

Session: Short Remarks

Session Date and Time (CDT): Tuesday, June 27 11:00 am

Session Chair: Patrick Huber

Questions:

Question for Jacob (Physics Opportunities at a Beam Dump Facility at PIP-II and Beyond):

Hitoshi Murayama: What is the physics advantage to going to 2 GeV?

Yu-Dai Tsai: To Hitoshi, I believe there is also 120 GeV beam option, which can probe higher mass LLP and millicharged particles.

Matthew Toups: In addition to extending the range of dark sector particle masses that a beam dump facility is sensitive to, higher beam energies opens up dark sector particle production from other meson decay channels such as from etas and kaons (if you go high enough in energy). For dark sector searches sourced from kaons, a slightly higher energy linac extension would be more optimal.

Jae Yu: In addition, these charged mesons produced in the target could also enhance the production of DSP's via adding a BSM leg, avoiding the helicity suppression.

Yu-Dai Tsai: A quick response to Hitoshi: The main goals of PIP-II include delivering 1.2 MW of proton beam power from the Main Injector (see the slides provided by Pedro below).

I believe there is an option to utilize the 120 GeV for beam-dump search at the ACE facilities, independent of the DUNE near-detector complex.

The existing SpinQuest experiment is using the 120 GeV beam, and DarkQuest / LongQuest are proposals to utilize the SpinQuest facility for dark matter and long-lived particle searches.

P. Machado: Here are slides that explain the difference between PIP-II, and the two phases of the accelerator complex evolution:

[https://indico.fnal.gov/event/59663/contributions/268289/attachments/167975/224776/ACEscien
ceworkshop.pdf](https://indico.fnal.gov/event/59663/contributions/268289/attachments/167975/224776/ACEscienceworkshop.pdf)

Sergo Jindariani: a comment in response to Hitoshi's question about using 2 GeV proton beam: If a 2 GeV linac extension is available in early 2030s, it could potentially be used for the Muon Collider ionization cooling demonstrator. While 2 GeV is lower than the ideal proton energy for the collider, it should be suitable for the demonstrator. High available power of the 2GeV beam makes it appealing when compared to limited available power at 8GeV from the current booster in the ACE Phase-1 era. Additional systems to strip the electrons from the H- beam and accumulate the beam may or may not be needed.