

# Physic Opportunities at the Booster Replacement

**Welcome and intro**

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**Accelerator Working group:** Mike Syphers, Jonathan Jarvis, Alexander Valishev, Eduard Pozdeyev, Sam Posen, Jeff Eldred, Ioanis Kourbanis, Valeri A Lebedev, Bob Zwaska.

# “Welcome” to Fermilab!



- We hope everyone is safe, healthy, and keeping a safe distance.
- The original plan was to hold a two day in-person workshop at Fermilab. That was foiled by a pandemic.
- We decided instead to have a kick-off meeting on zoom + collection of input + a second zoom meeting. Getting together would have been fun, but we will make the best of it!

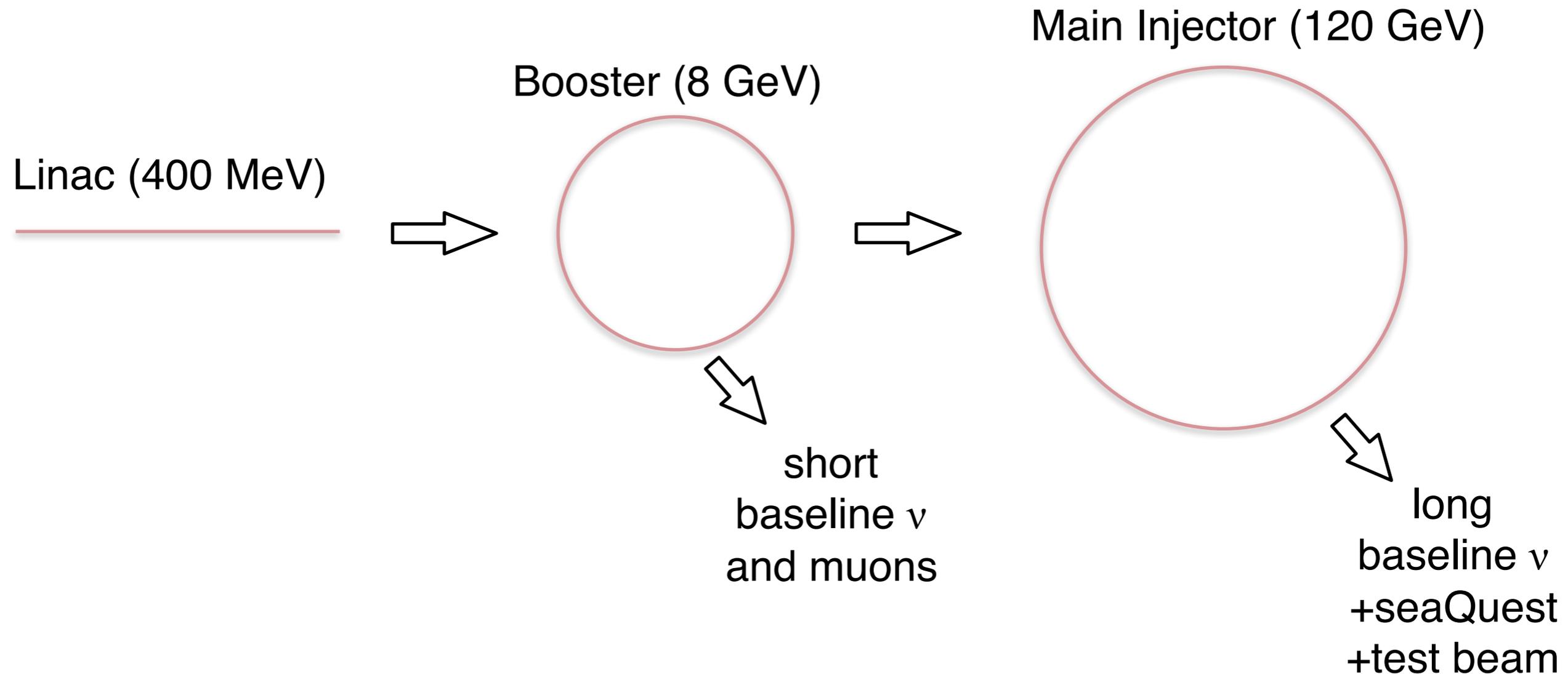
# Zoom

- We will likely use the usual zoom practices.
- Use the “raise hand” feature for questions.
- We will try to track comments and questions in the chat as well.
  
- (my fellow organizers are welcome to help on these fronts.)

# The Booster Replacement

The P5 report sets a goal 2.4 MW in LBNF in order for DUNE to achieve its science goals.

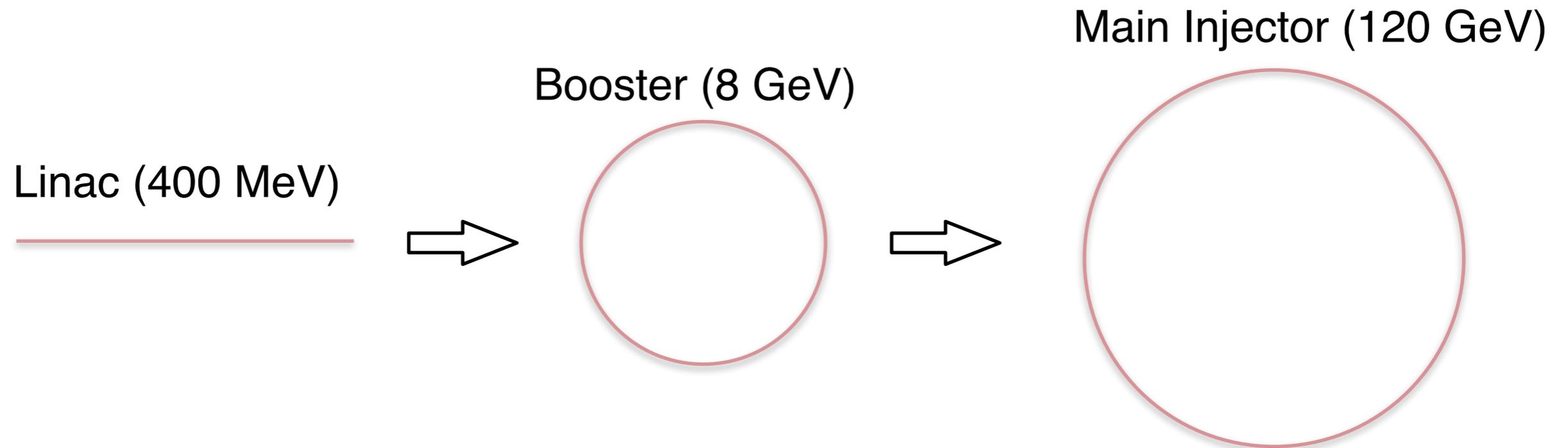
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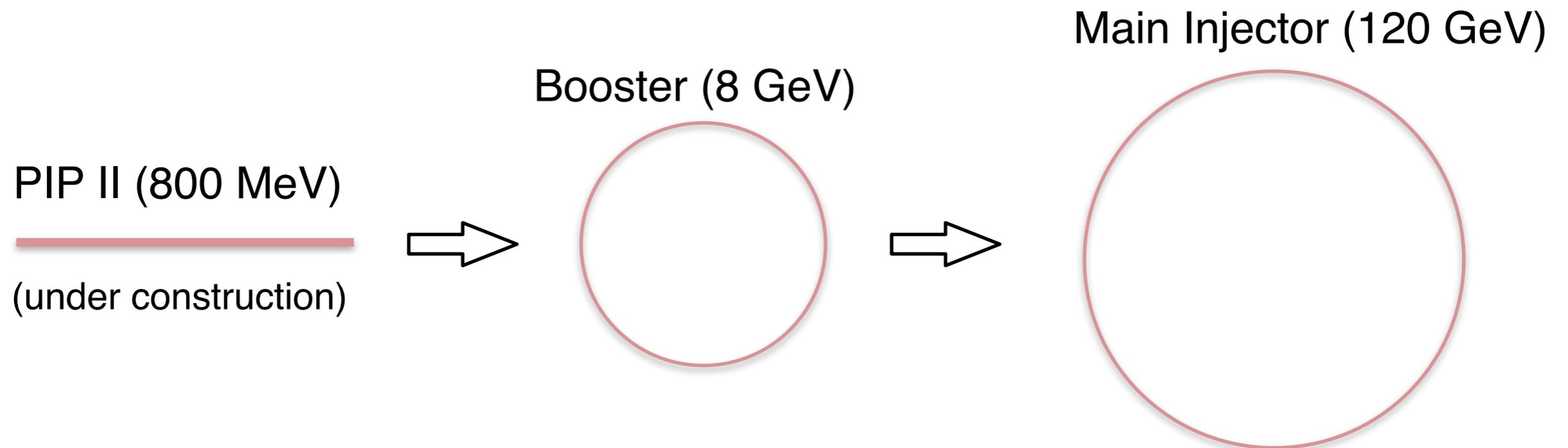
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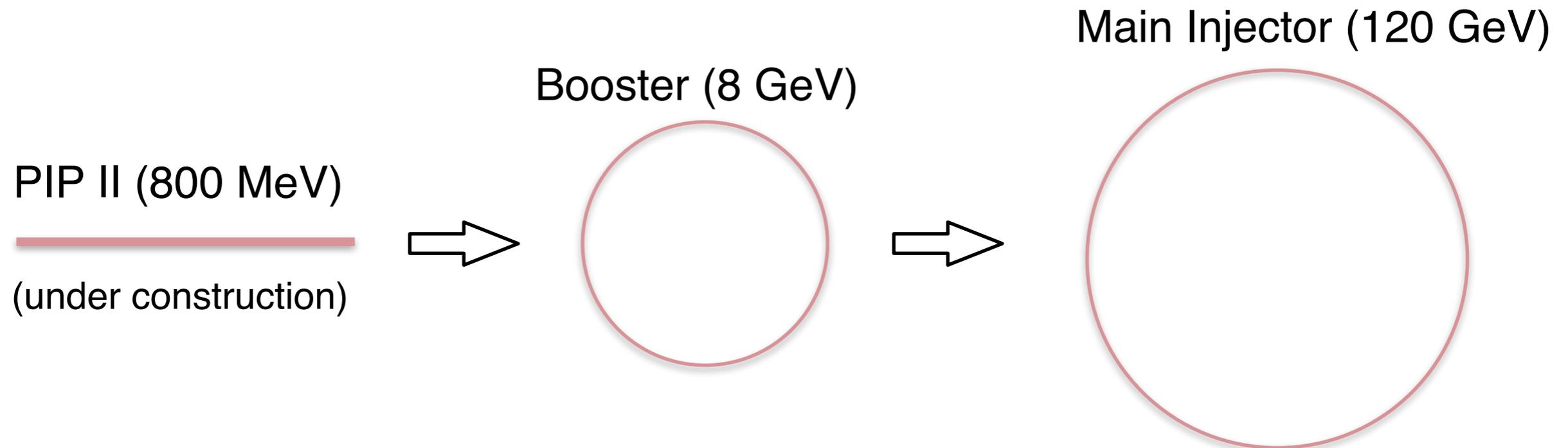
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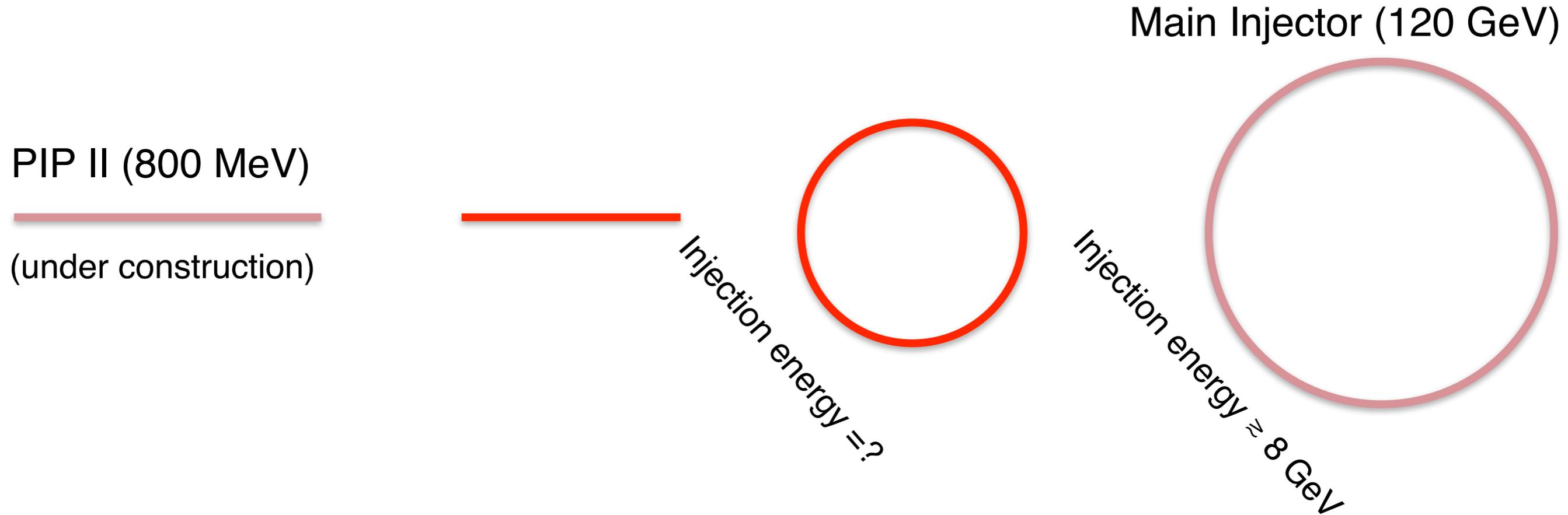
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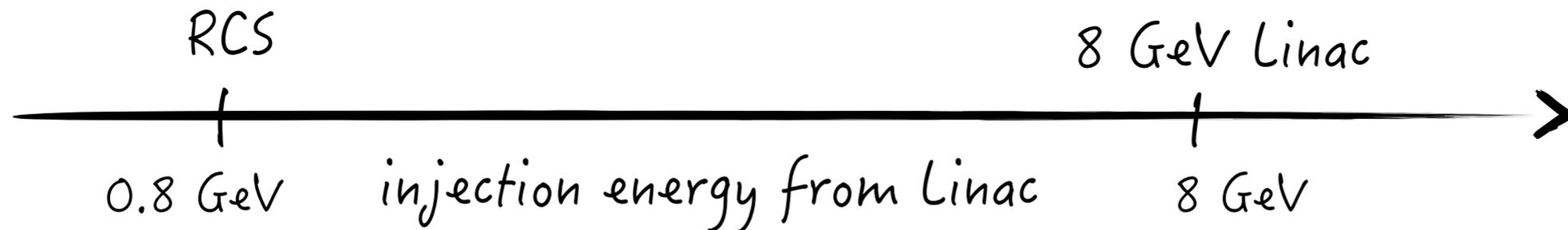
2.4 MW amounts to more than  $10^{14}$ /sec at 120 GeV. The Booster cannot keep up, must be replaced. MI will need upgrades.

# The Booster Replacement Possibilities:

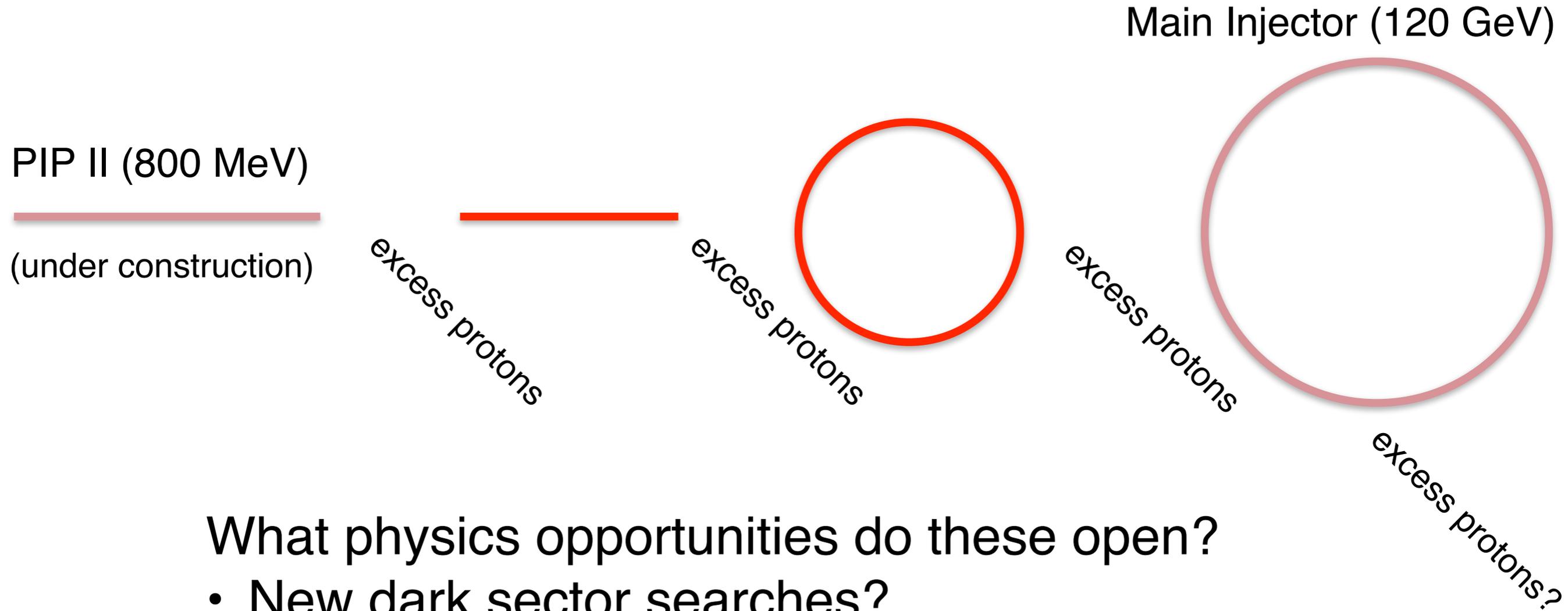


An extension of the Linac and/or a new Rapid Cycling Cyclotron (RCS).

The transition between these is a major design choice.



# This workshop: Physics Opportunities



What physics opportunities do these open?

- New dark sector searches?
- New precision tests?
- Acceleration of electron or other in the Linac?
- ...

**We would like your input!**

more on this in the afternoon.

# FAQ

**Q:** So are we making the priority list for upcoming experiments?

**A:** No. We are informing the accelerator design. Accelerator scientist have many options to get to 2.4 MW.

Where should the gaps between accelerators be?

What physics experiments can we envision may fill these gaps?

*The current Fermilab booster, was originally built 50 years ago. The goal is to leave the door open to as many exciting physics options as possible for the decades to come.*

**Q:** How will we converge on a design?

**A:** A committee is assembled, chaired by Tribble (BNL) and Arduini (CERN) to which our working groups will report. Receiving input through this workshop is a key step along the way.

# Plan for today and Beyond

## **Morning session: Accelerator physics**

Accelerator physics primer and intro to the Booster Replacement.  
Talks on PIP II, Linac extensions, SRF technologies, RCS's.

## **Afternoon session: Physics physics**

Plan for getting input from all of you.  
Examples of physics opportunities.  
Discussion.

## **In the coming weeks:**

Thought, discussion, self organization,  
Collection of input (more this afternoon).  
Another zoom meeting to present input and discuss (date TBD).