

Physics on the Way to 10 TeV

Energy Frontier Report: 2211.11084

For the five year period starting in 2025:

1. Prioritize the HL-LHC physics program, including auxiliary experiments,
2. Establish a targeted e^+e^- Higgs factory detector R&D program,
3. Develop an initial design for a first stage TeV-scale Muon Collider in the US,
4. Support critical detector R&D towards EF multi-TeV colliders.

BIG QUESTIONS

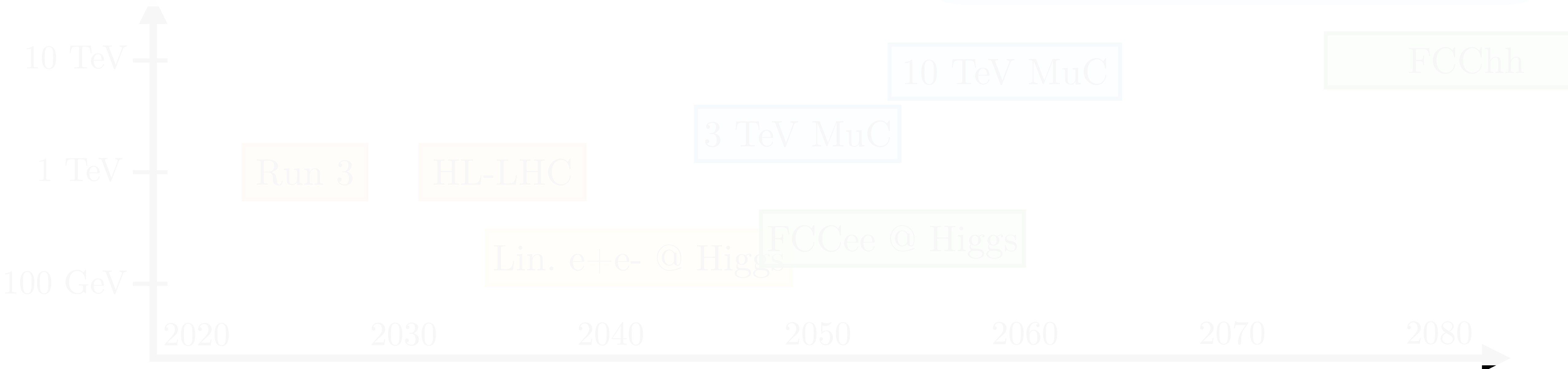
Early Universe? Flavor?

New Physics? BAU? Neutrino Mass?

Nature of DM? EW Scale?

AT HIGH ENERGY

Future Collider Time Scales



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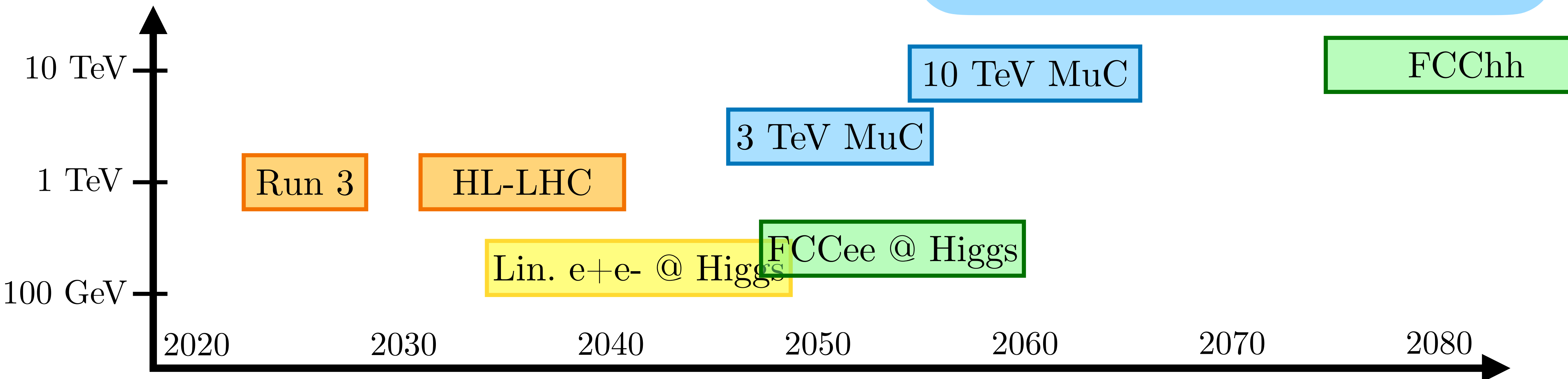
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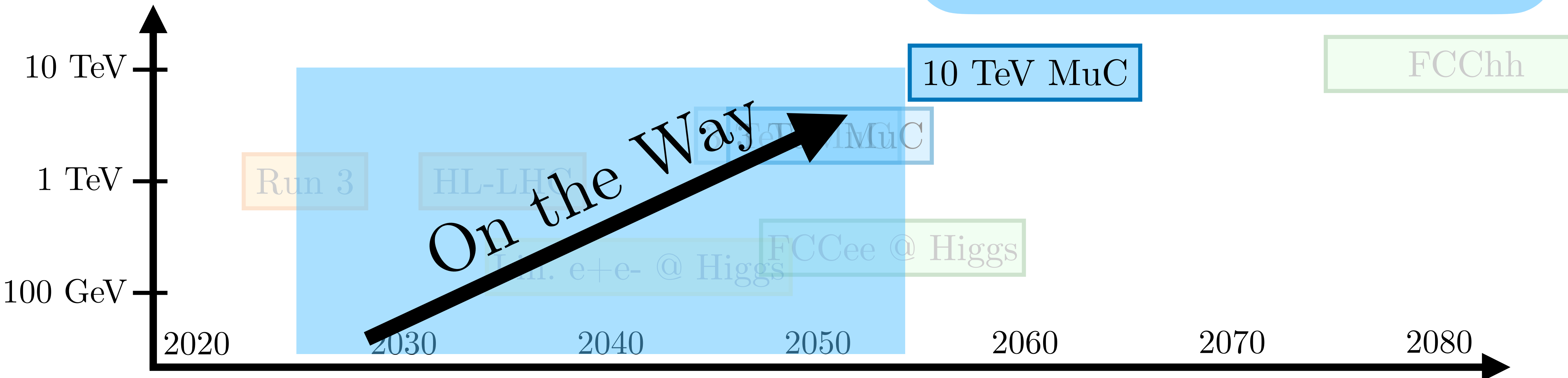
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Physics at Muon Collider Demonstrator Facilities



Facilities needed for MuC R&D can:

Utilize existing experiments' infrastructure (like DUNE)

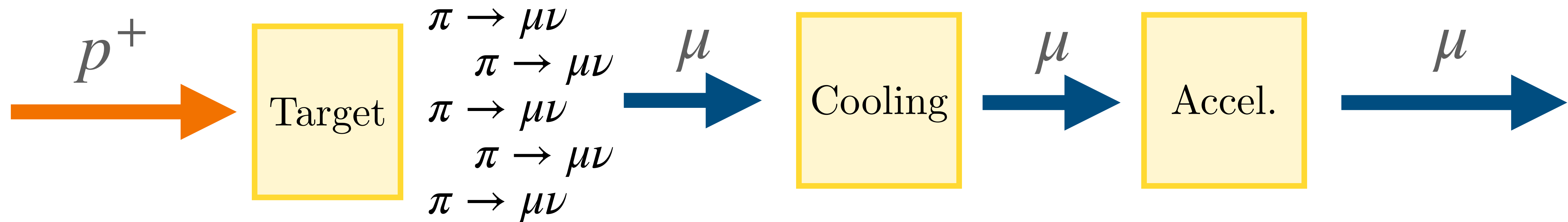
Probe rare or suppressed physics processes

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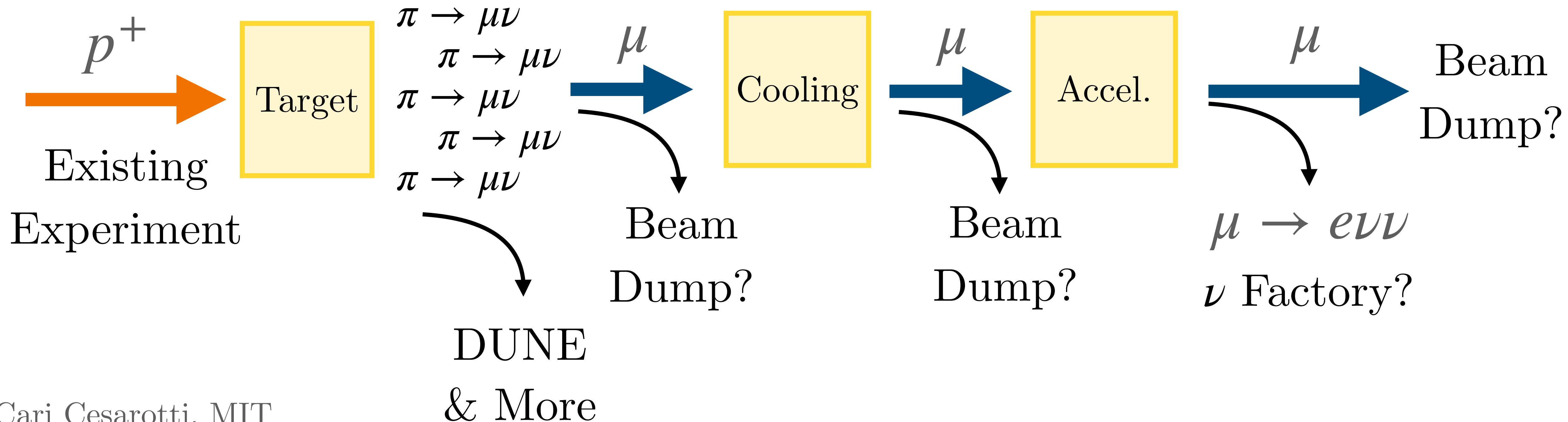


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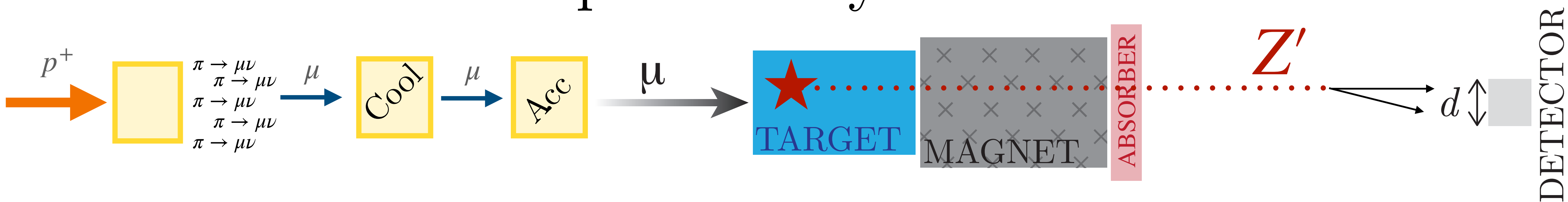
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Beam Dumps at Demonstrator Facilities

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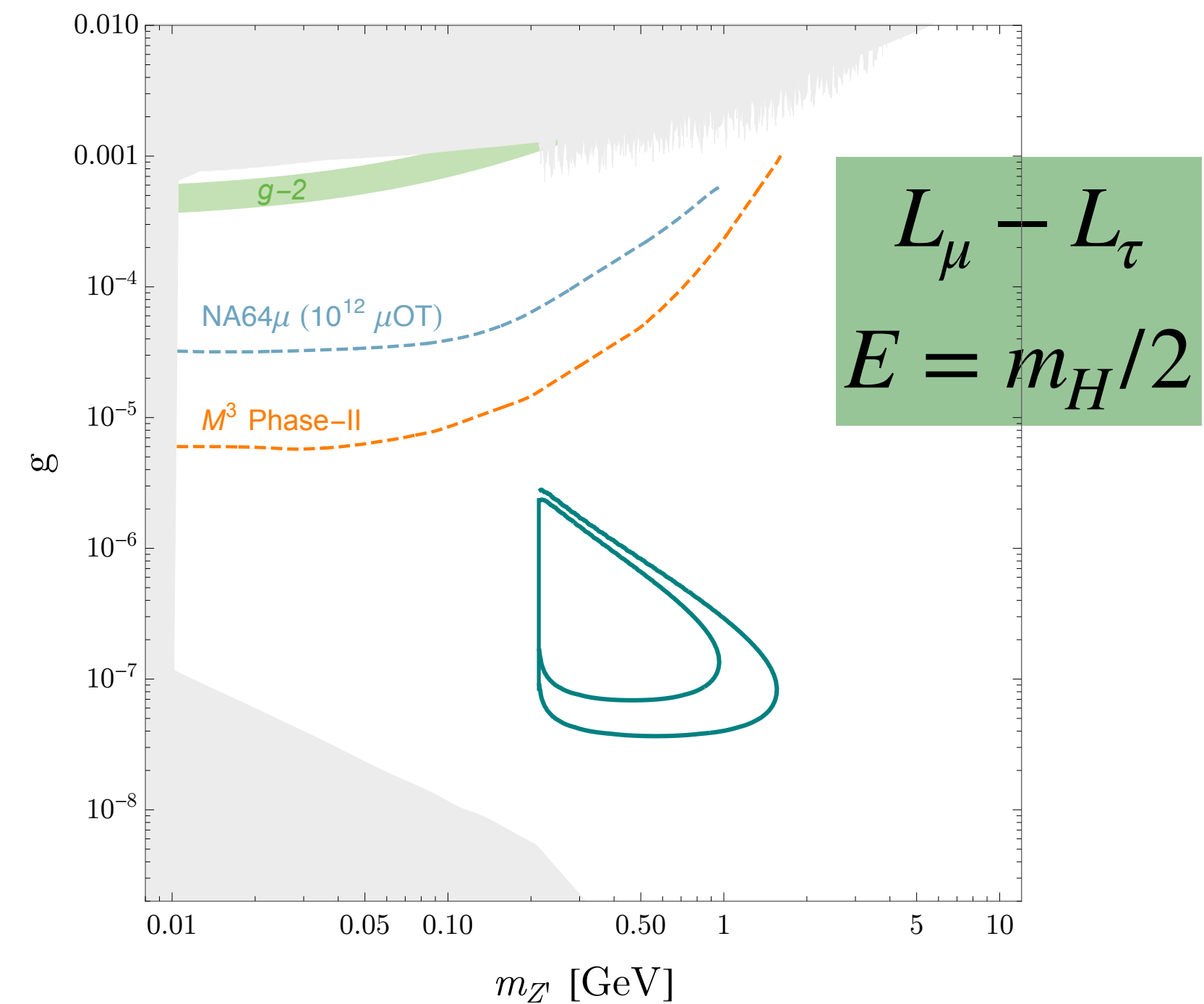
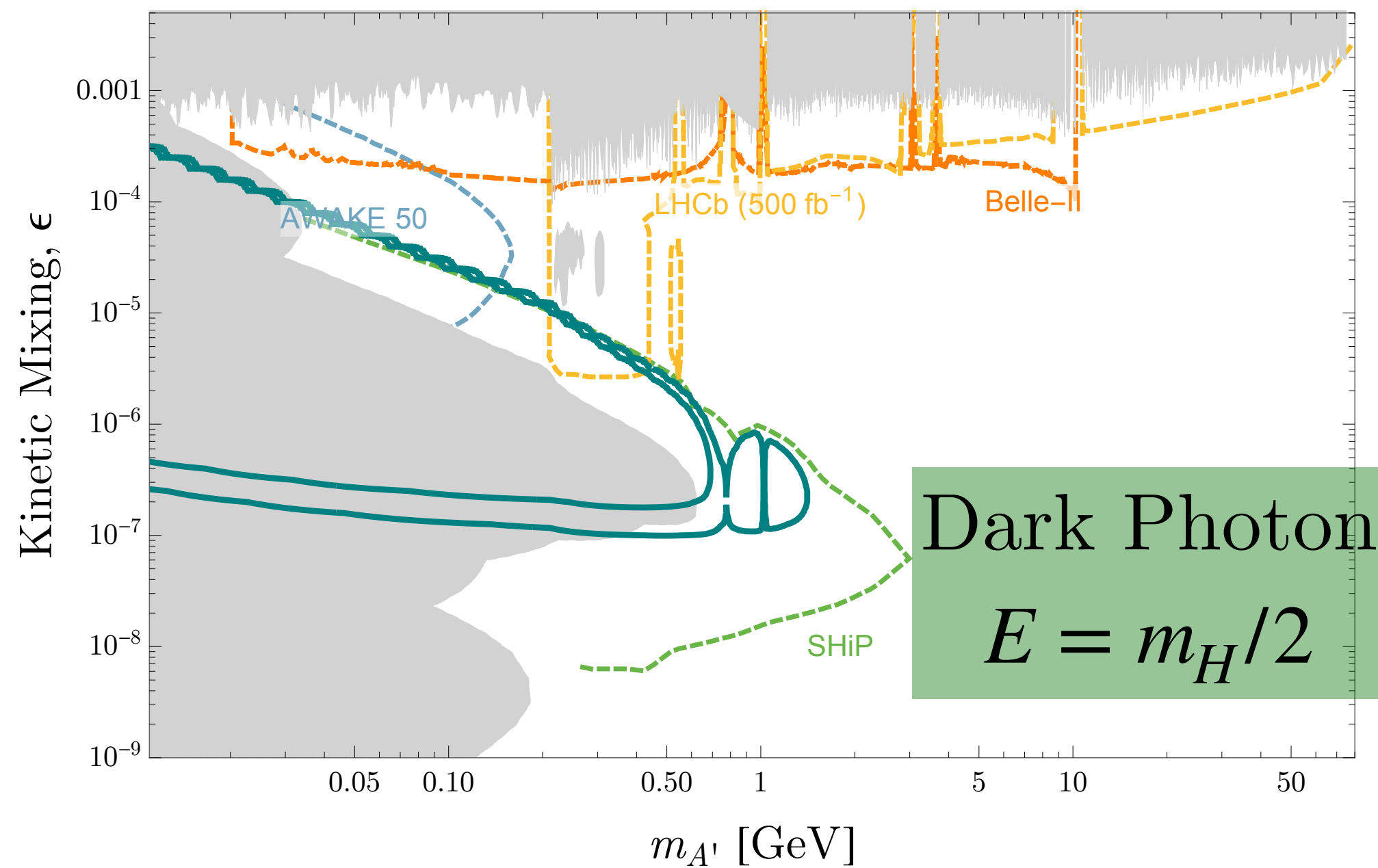
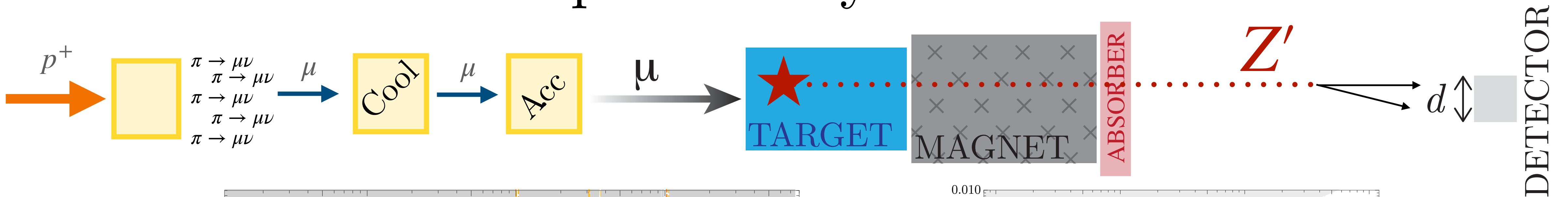
Beam dumps are low-cost auxiliary experiments with complementary reach to main collider



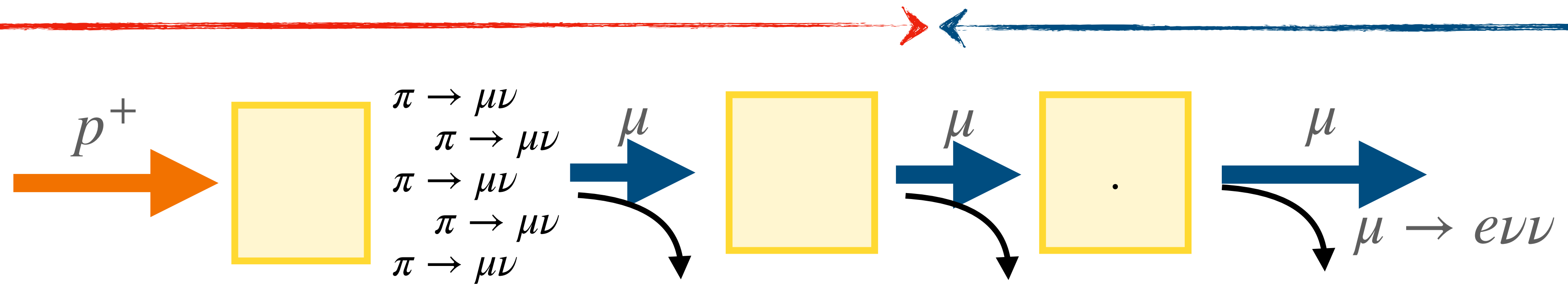
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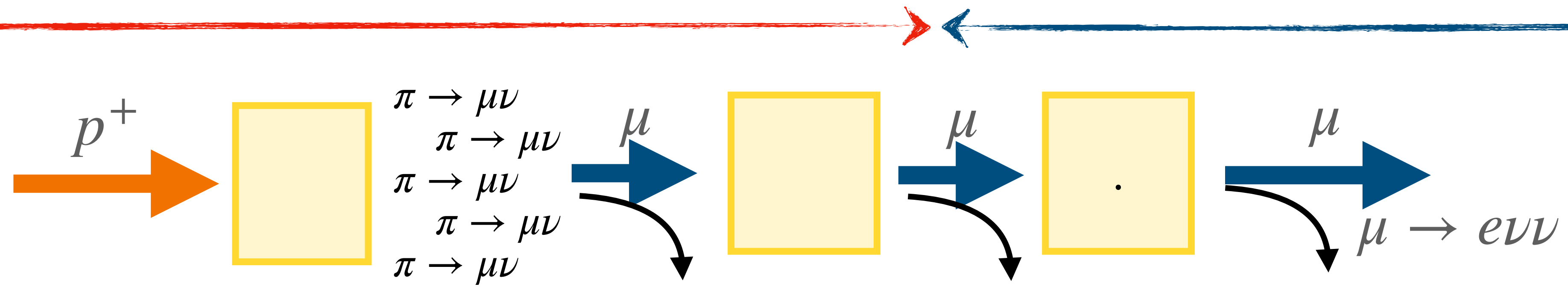
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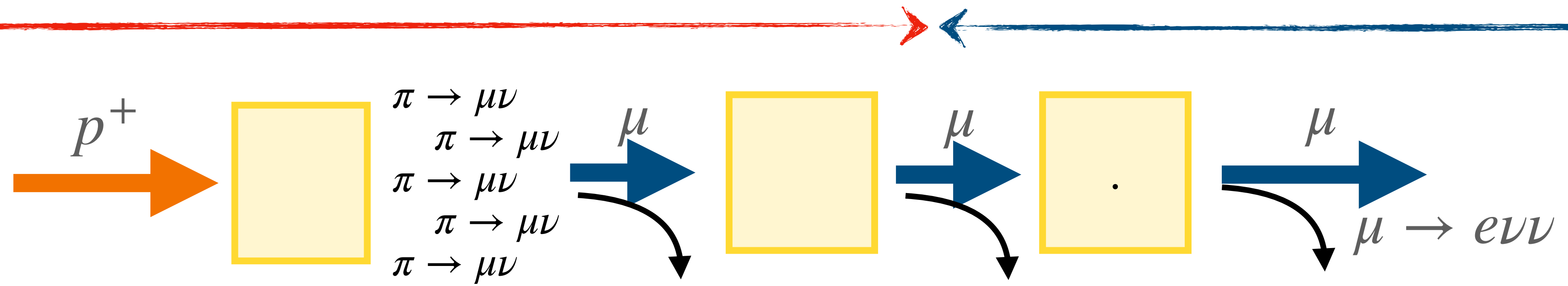


DUNE ACE Upgrade

ESS ν SB 2107.07585

LHC TT10

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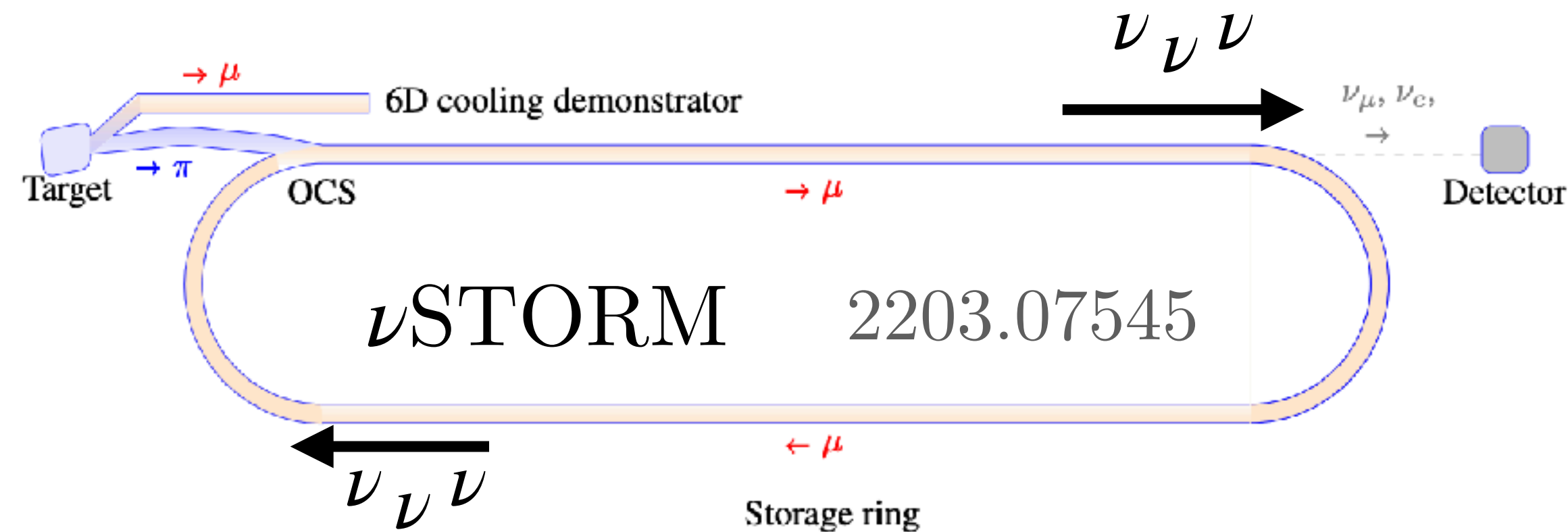
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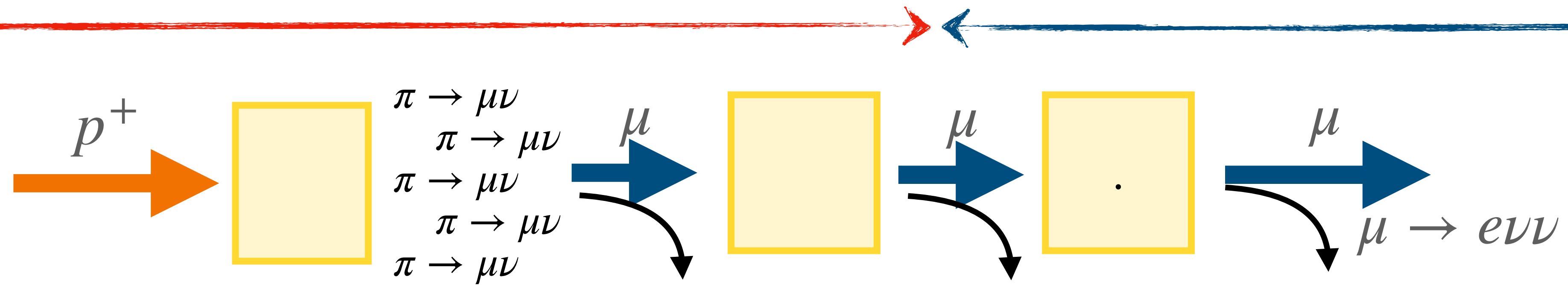
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Muon Beam Dump

Neutrino Physics (e.g. ν STORM)



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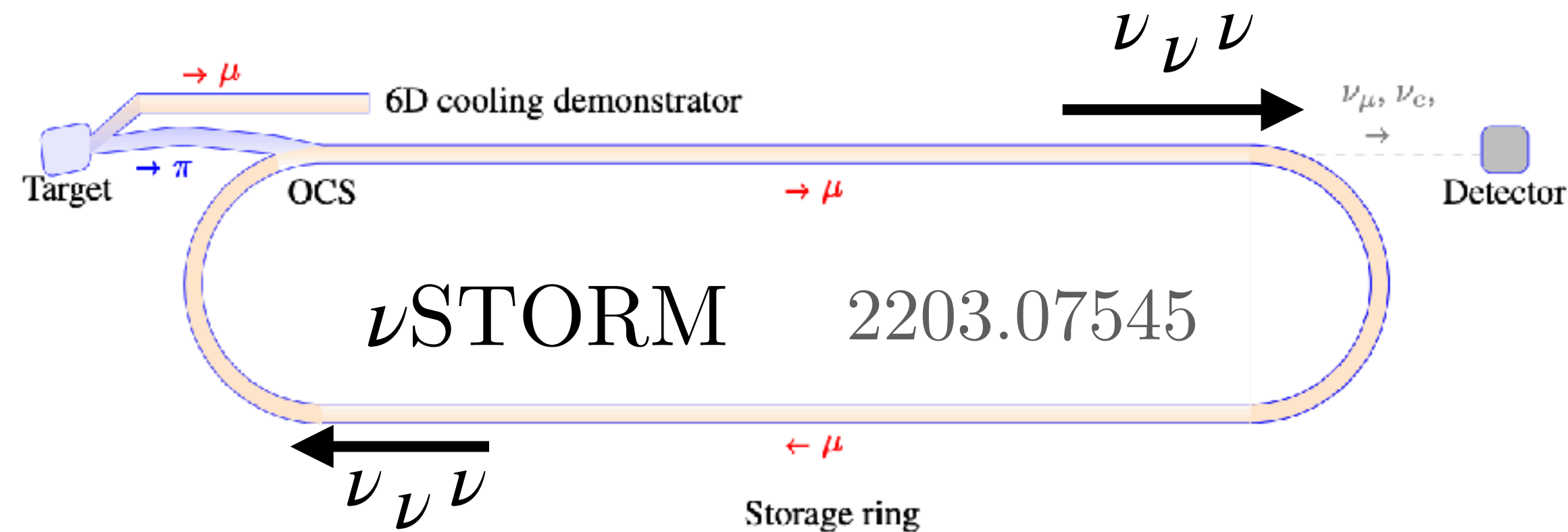
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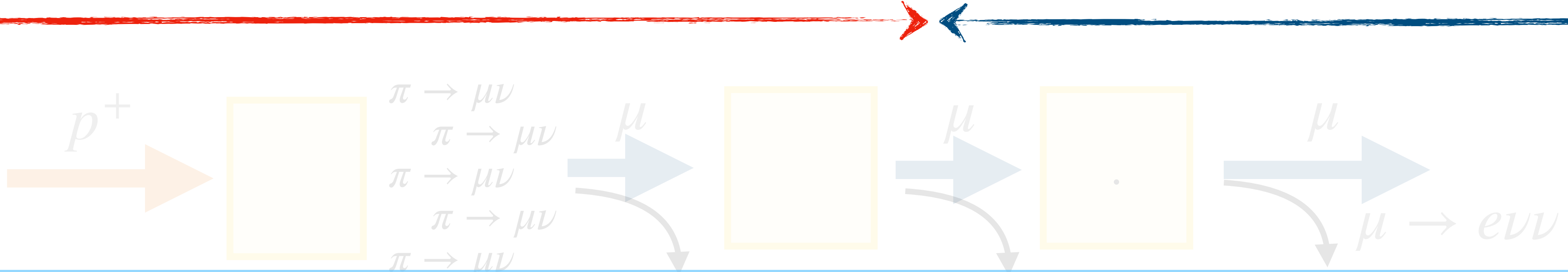
Muon Beam Dump

Neutrino Physics (e.g. ν STORM)

And more?



Physics at Muon Collider Demonstrator Facilities



What we need:

Funding for R&D for proof-of-concept demonstrator facilities and funding for theorists to explore physics possibilities along the way

