



UPPSALA  
UNIVERSITET



Co-funded by  
the European Union

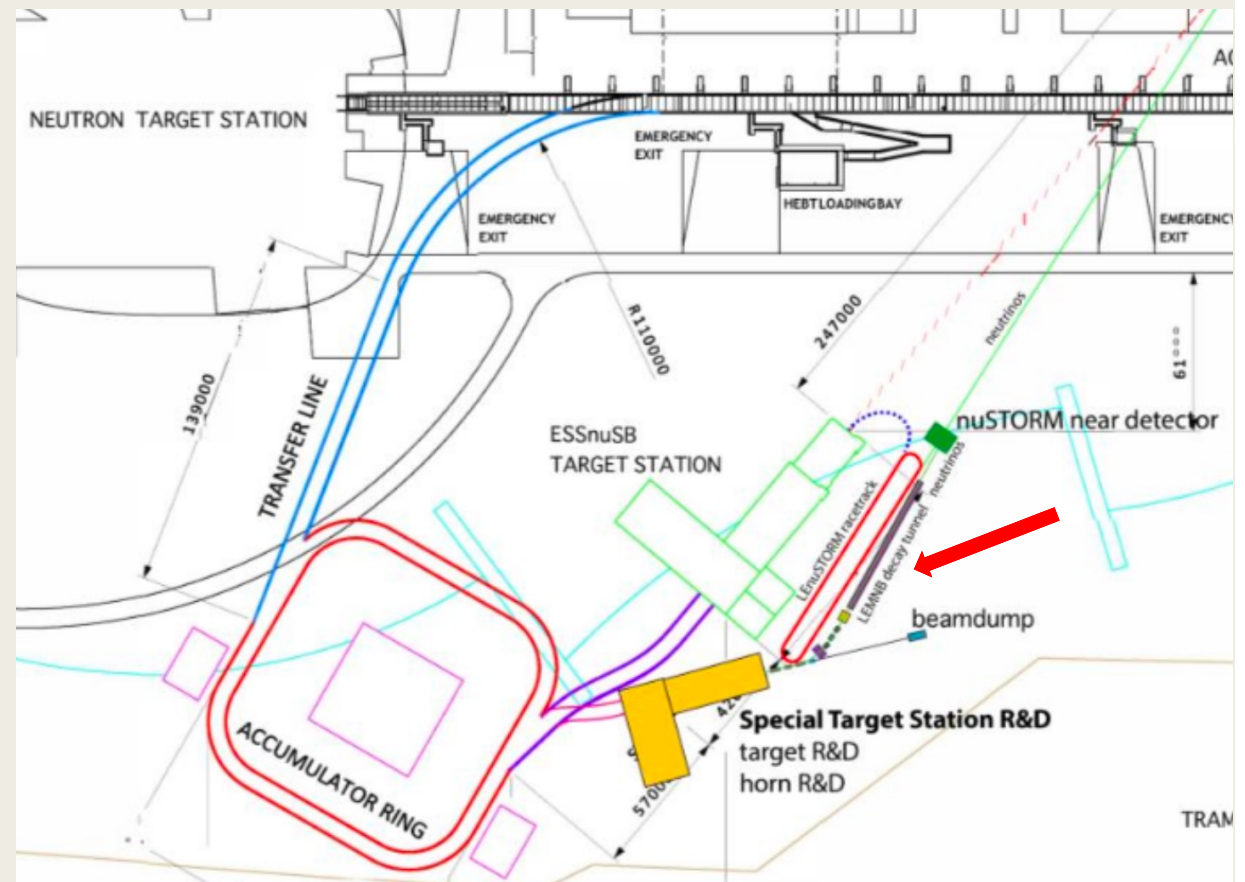
# WP4 : DESIGNING A LOW-ENERGY MUON STORAGE RING FOR NEUTRINO PHYSICS

PhD: CHOI Ting Wing

Main supervisor: Maja Olvegård

# ESSnuSB+ nuSTORM

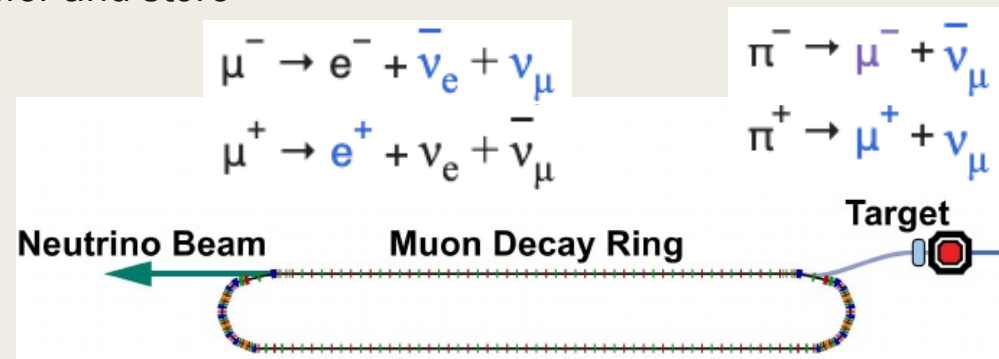
- An upgrade of ESSnuSB
  - *make precision measurements of the neutrino cross-sections* (0.2 - 0.6 GeV)
- By a Low energy Neutrinos from Stored Muons (LEnuSTORM)



Ale kou, A., et al. "The ESSnuSB design study: overview and future prospects." *arXiv preprint arXiv:2303.17356* (2023).

# nuSTORM

- nuSTORM (“Neutrinos from Stored Muons”) is a neutrino project based on a muon decay ring.
- capture, transfer and store



<https://arxiv.org/abs/1507.08836>

- Known flux and equal fluxes of electron- and muon-neutrinos
- Their energy spectrum can be calculated precisely
- try to maximize the number of useful neutrinos. → ring design

# Work package objectives and tasks

- Task 4.1: ...  
Task 4.2: ...
- Task 4.3: Conceptual design of the racetrack ring for LEnuSTORM (UU, ESS, CERN, ESSB)
  - I. Initial transport of pions* ■ CERN
  - II. Injection* ■ CERN
  - III. Ring lattice* ■ UU (Ting, w help from Maja)
  - IV. Muon/Neutrino flux* ■ UU (Ting, w help from Maja)
- Task 4.4: ...

# Status, target and Plan in this meeting

- Status of my part (Low energy nuSTORM ring) in WP4:
  - Personally: getting familiar with the project, studying the related neutrino physics, accelerator physics and background, and living my PhD life. No significant research results have yet.
  - project: waiting for the pion distribution from WP3 to estimate the neutrino flux.
- My aim in this meeting
  - Personally: learn some interesting neutrino physics and detector physics, and have fun.
  - Project: to roughly estimate the number of neutrinos
- Plan: For the project, I need
  1. the pion distribution (ideally from the horn but worst case directly from the target), soon
  2. the angular distribution/spread from each decay.
  3. Rough number of capture efficiency and ring acceptance

**Just let me know if you want to know anyway thing about nuSTORM!  
Looking forward to working with all of you!**