Beam dump experiments at PIP-II with low threshold detectors (eV).

Juan Estrada
Fermilab

the main point

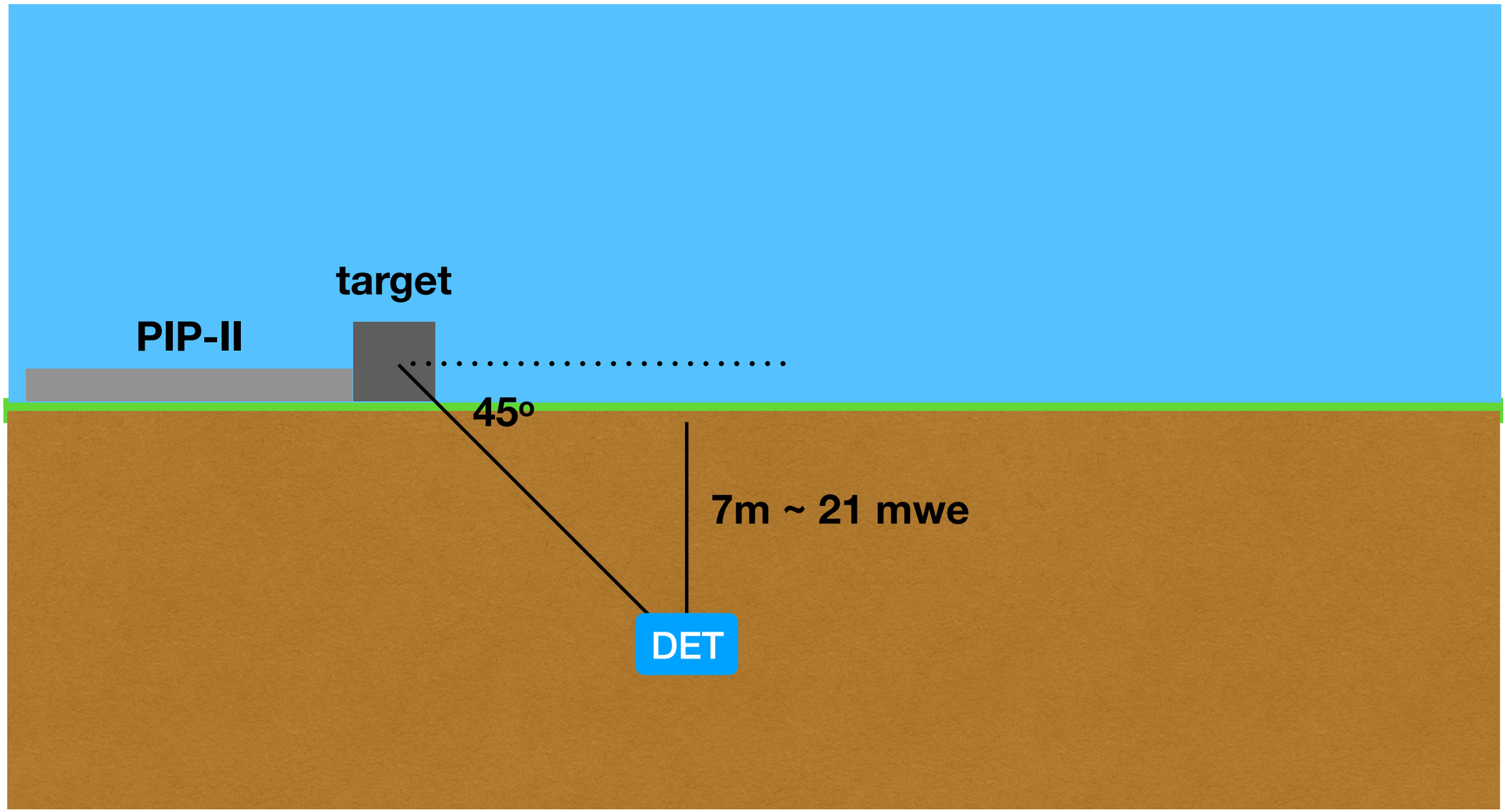
- Significant progress has been done developing new technologies for detecting low energy nuclear and electron recoils for direct DM search (WP: micro-calorimeters, CCDs, SBC)

- These technologies combined with high intensity proton beams provide new opportunities for dark search searches (WP: mCP, ALPs, more general kinetic mixing). Lowering threshold for dark sector is equivalent to increasing detector mass by the same factor, or the POT.

- background, background background

progress during this workshop

- background from environment (not huge problem)
- background from detector materials not huge problem)
- background from beam (…. mmmmm)


target
PIP-II
45°
7m ~ 21 mwe
DET

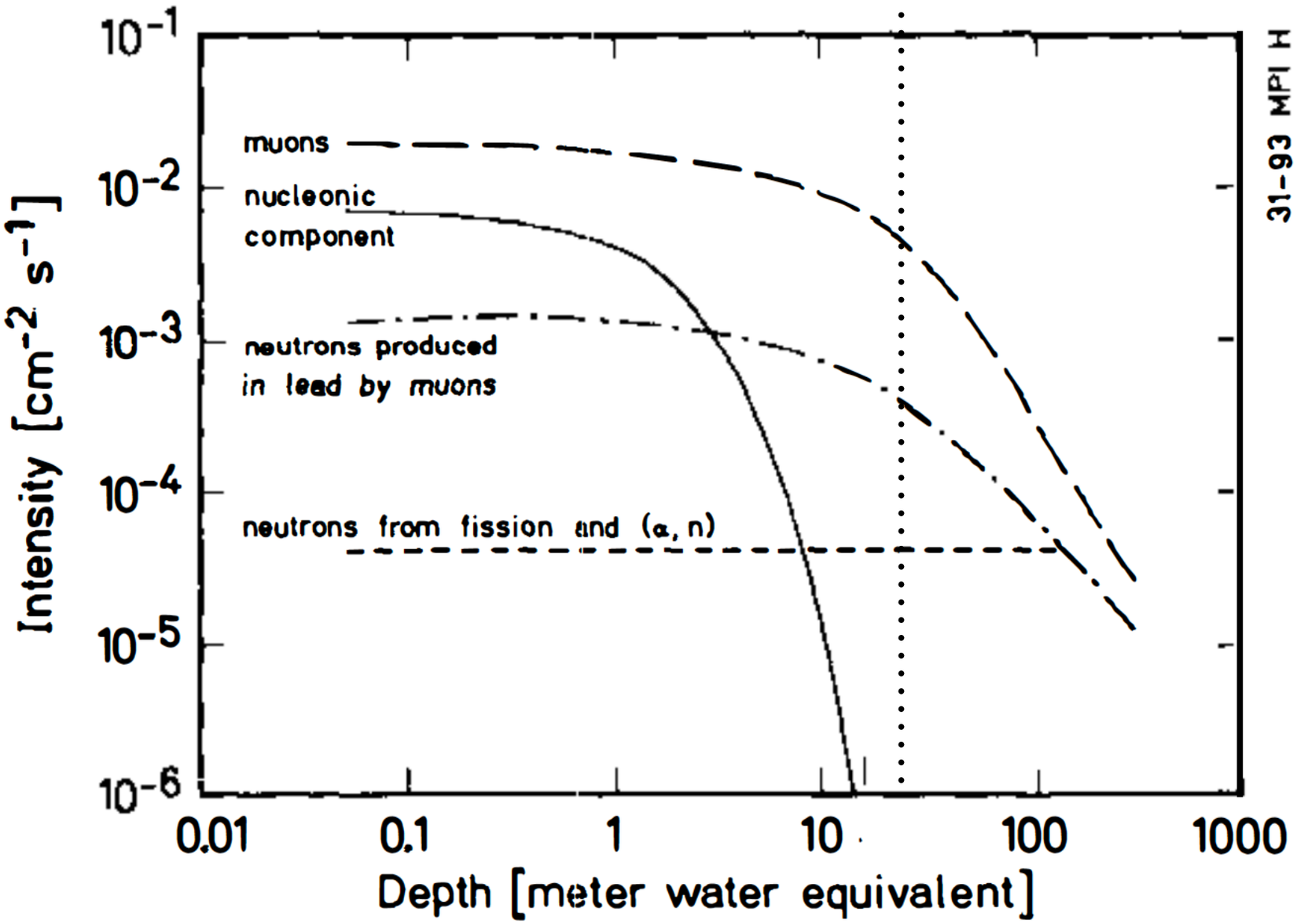
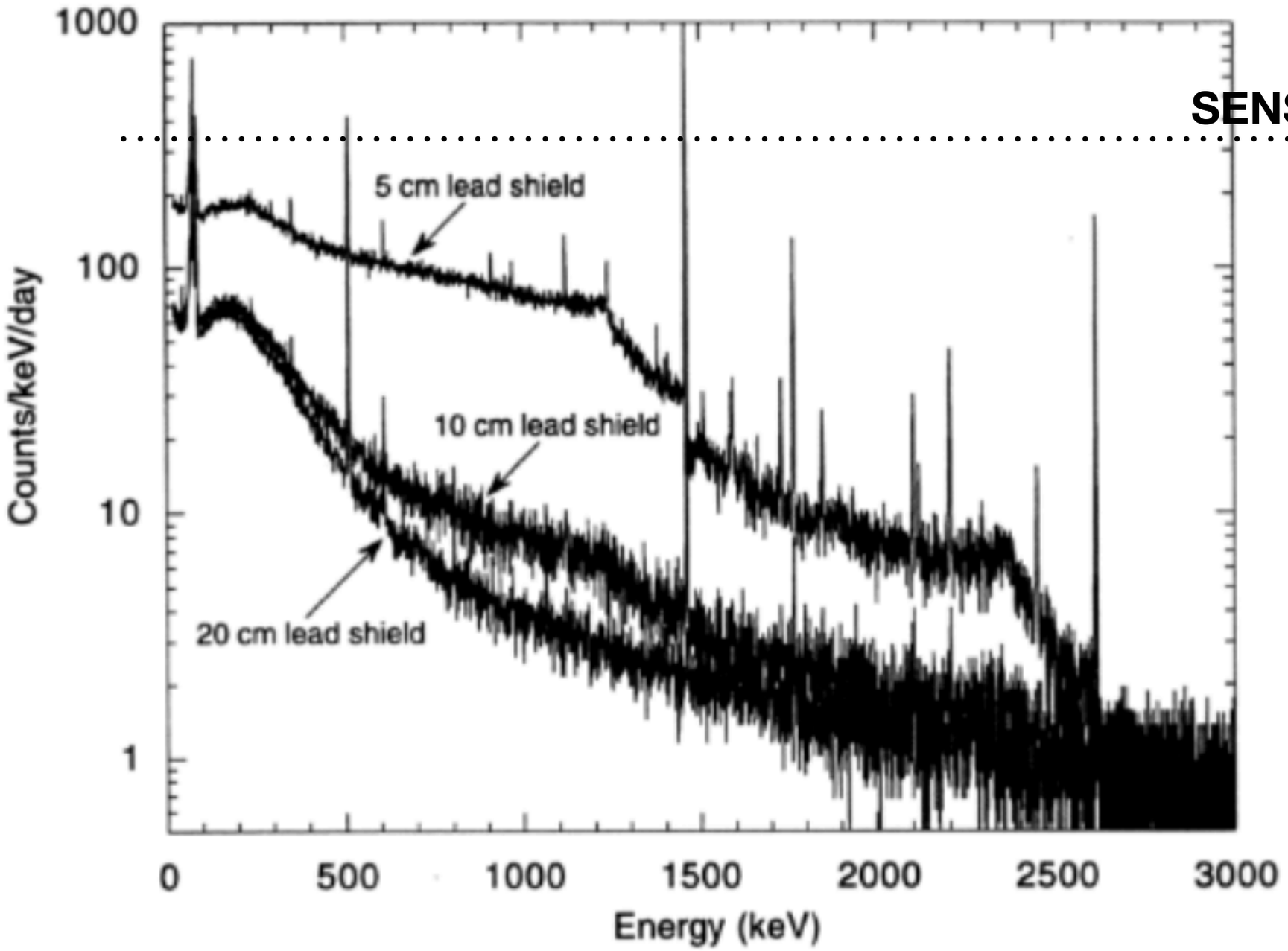


Figure 2 Flux of cosmic ray secondaries and tertiary-produced neutrons in a typical Pb shield vs shielding depth. Neutron flux from natural fission and (α, n) reactions is also shown. The nucleonic component is more than 97% neutrons.

measurements at 17 mwe in Stanford shallow underground site (Da Silva thesis)



SENSEI@MINOS

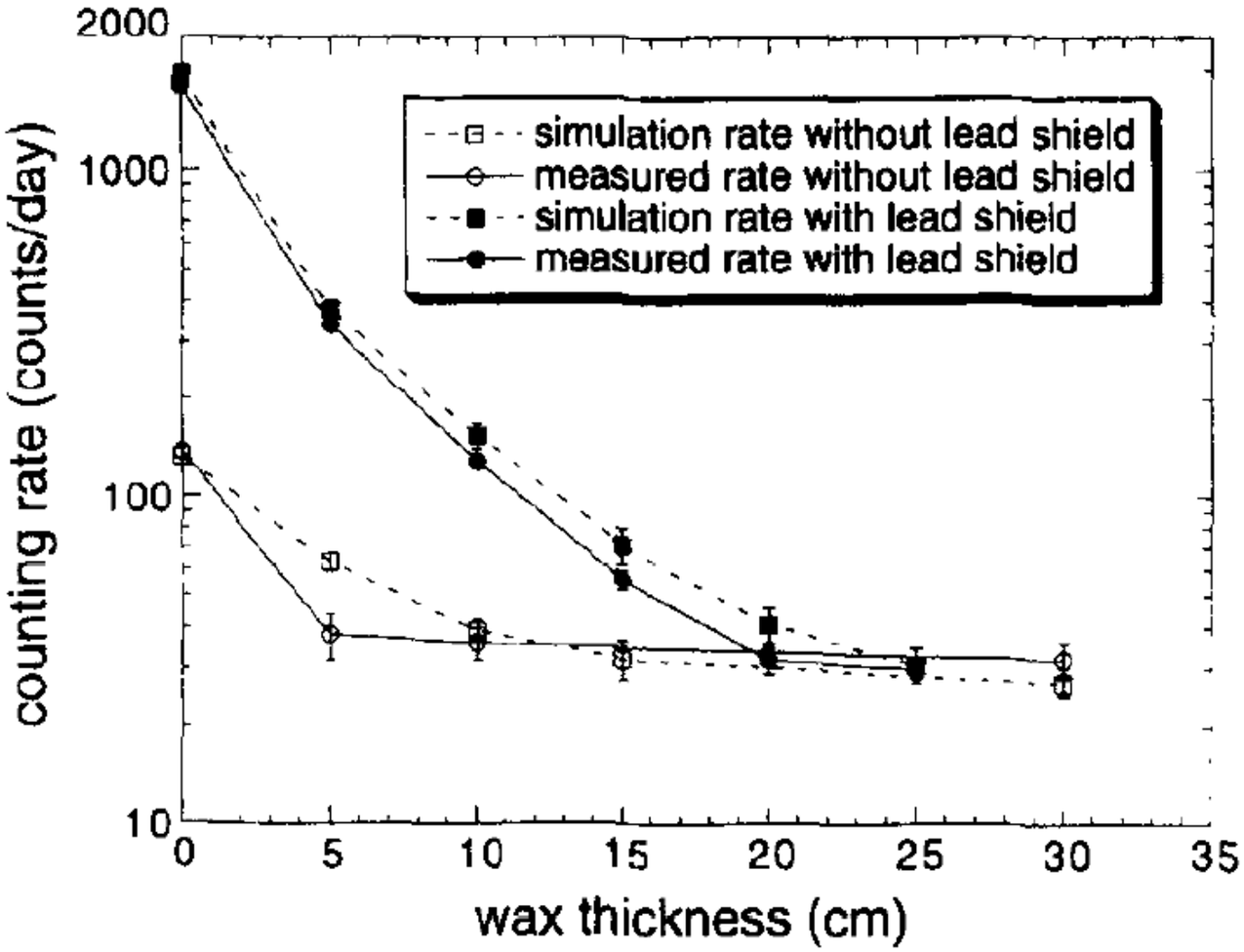
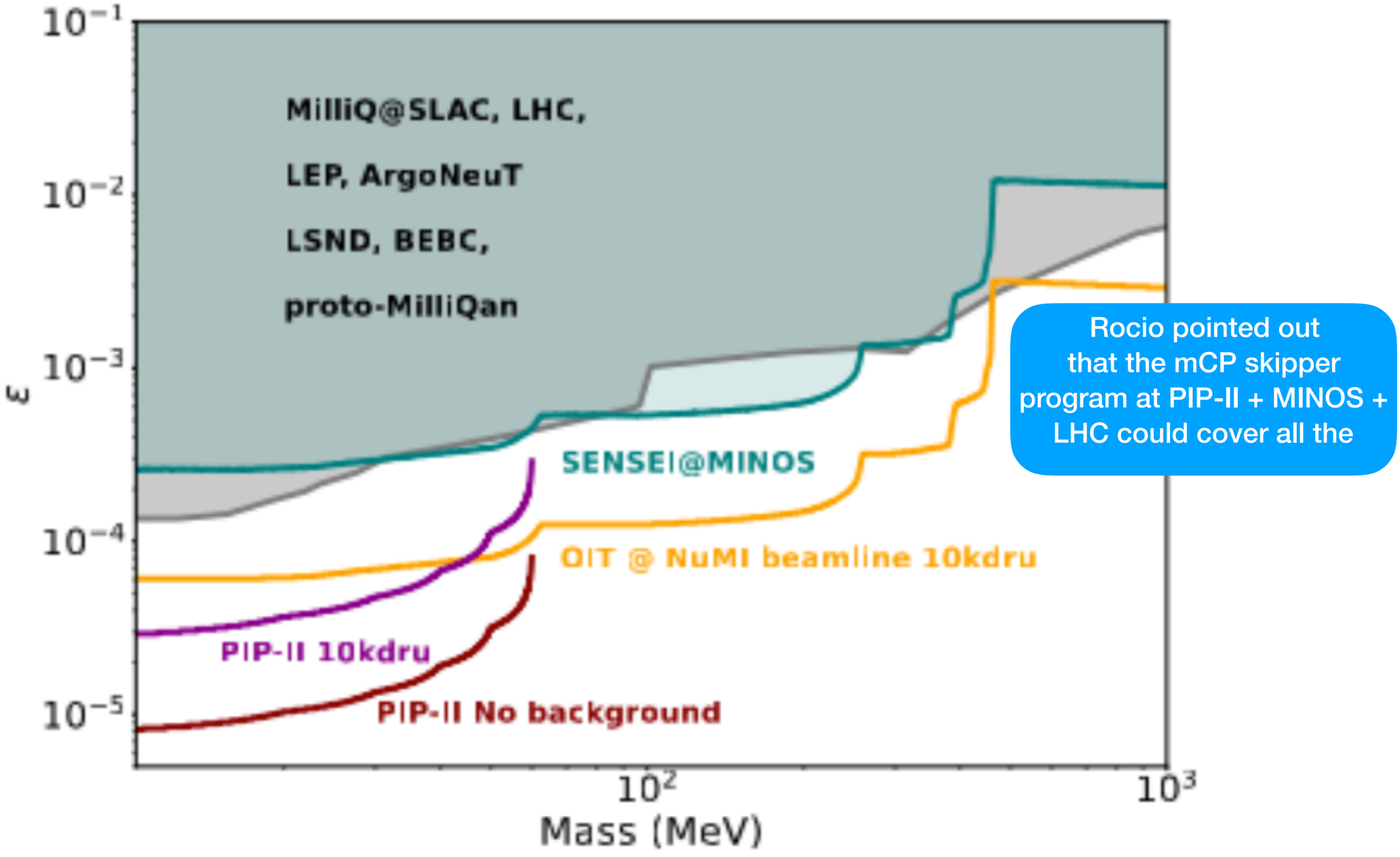


Fig. 3. Comparison of the measured neutron counting rate as a function of the wax thickness surrounding the BF_3 detector and the simulated neutron counting rate, with and without a 4 in. thick lead shield, at the Stanford Underground Facility.

the lead generated neutrons, that you can shield

from Santiago Perez



Rocio pointed out that the mCP skipper program at PIP-II + MINOS + LHC could cover all the

has now done this with very large background (from reactor experiment)and no tracking (tracking will probably help a bit)

still sounds like an interesting idea…

If we have an accumulator ring will have more handles to control background, but we probably want to try this at the end of PIP-II even before the ring

Main next step : realistic target simulation and associated background.