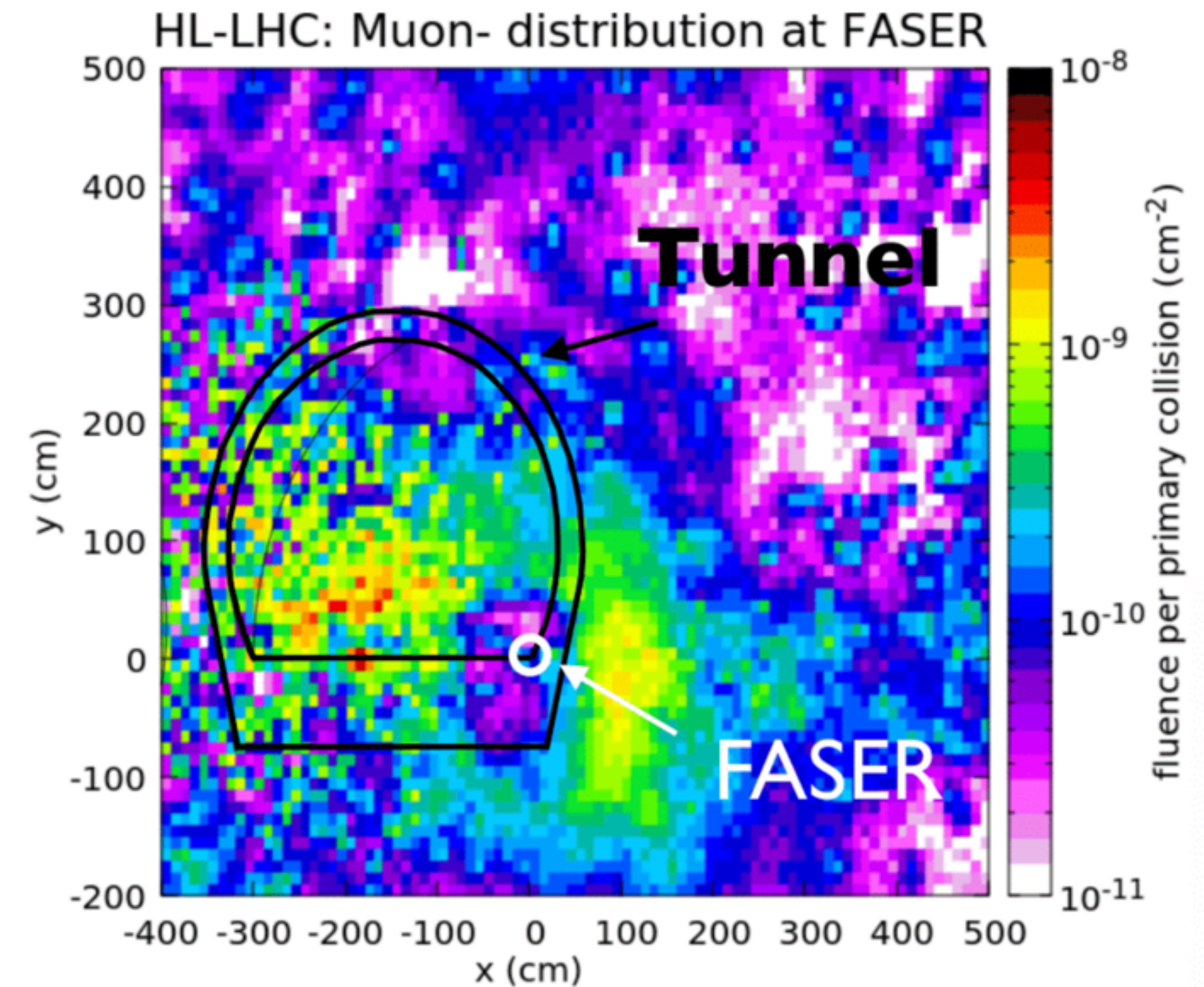# Background

Consideration on FASER background

- A residual **muon flux** (tens of Hz) still passes through the tunnel.

  - They can produce **secondary showers** via bremsstrahlung, pair production, or nuclear interactions.

- Background Simulations at FASER

  - FLUKA simulations by CERN EN-STI group.

  - Include effects of LHC magnets & infrastructure.

  - Simulated particle fluence rates at 13 TeV, normalized to L = 2×10^{34} cm^{-2}s^{-1}.

  - Muon flux higher off-axis due to LHC optics.

  - FASER placed in a *low-flux region* of TI12 tunnel → reduced background.

- Cosmic Rays: Negligible in comparison to beam-related particles.
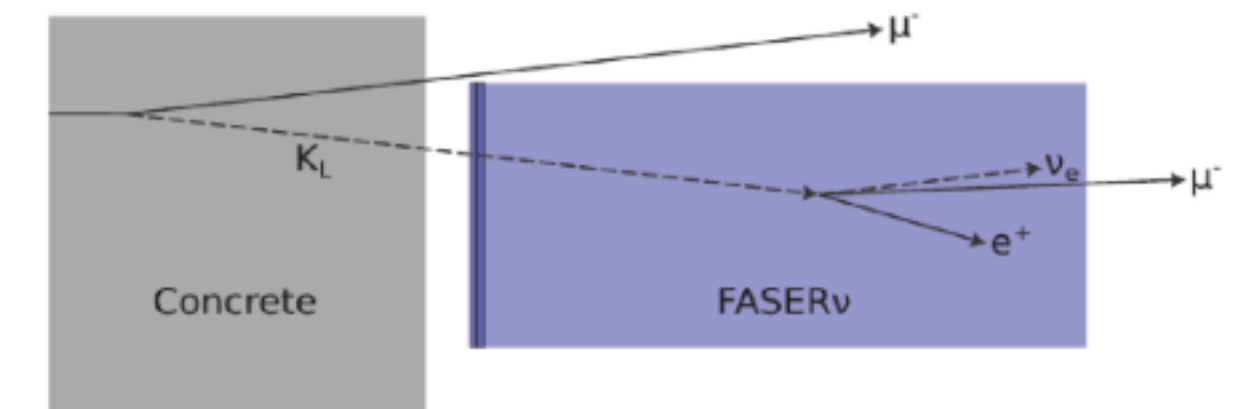

HL-LHC: Muon- distribution at FASER

*Fluence (Φ) is the number of particles crossing a unit area.

Background

Consideration on FASER background

- Veto System in front of the detector: tells if a particle came from outside.

- 1. Neutral hadrons, but assume it misses veto system

  - Most neutral hadrons absorbed in tungsten without producing high-momentum track

  - Only a tiny number can fake a neutrino: **Expect 0.11 ± 0.06 events**

- Scattered muons that miss veto system (rare) :

  - These are muons from the LHC that scatter a bit before reaching the detector.

  - **Expect: 0.08 ± 1.83 events**