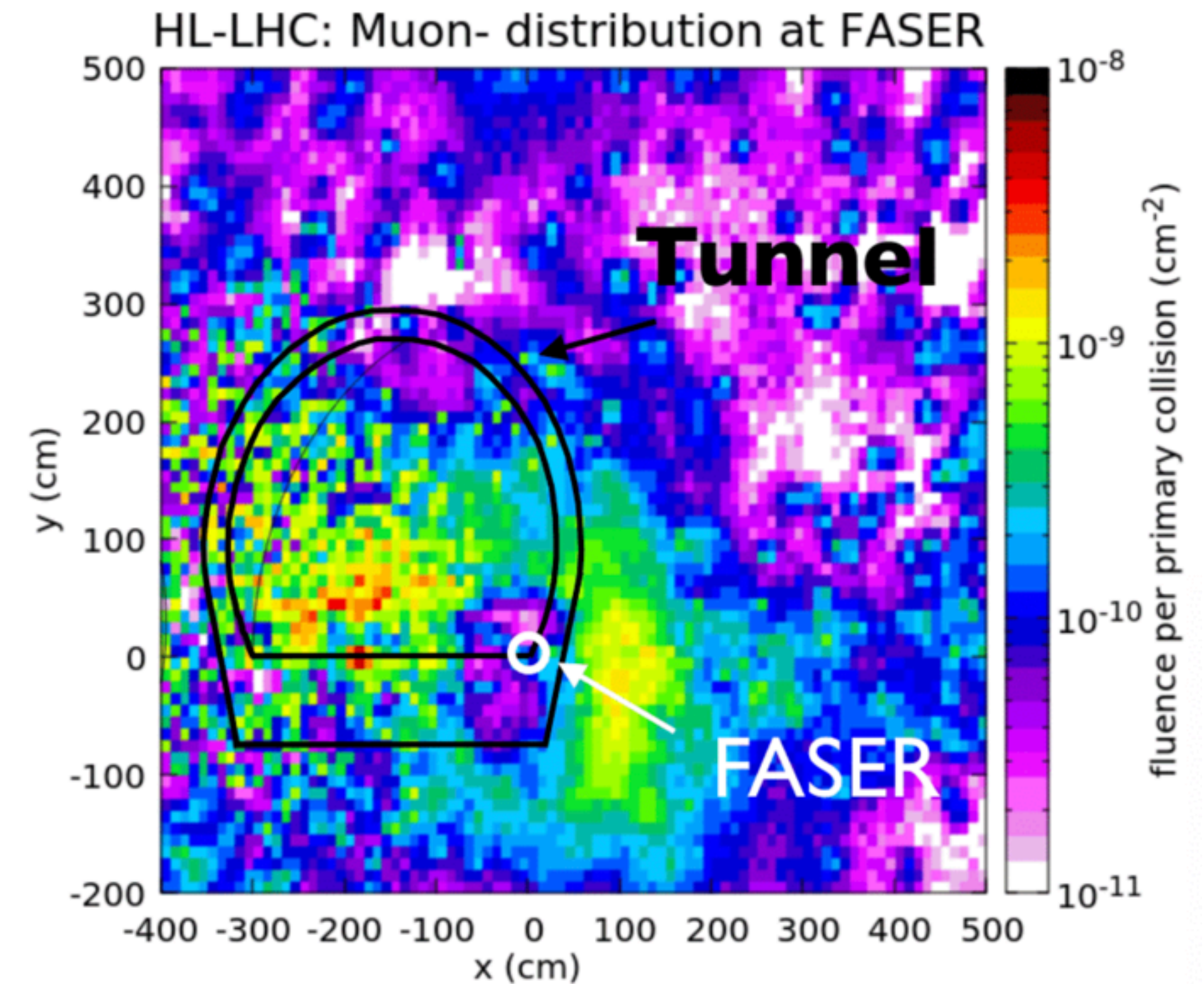


Background

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 $L = 2 \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$.
 - 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.



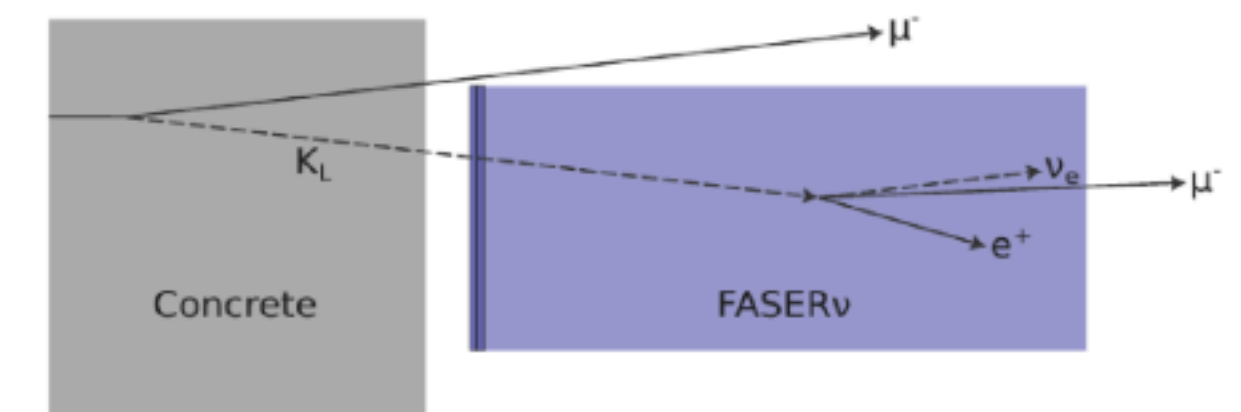
*Fluence (Φ) is the number of particles crossing a unit area.

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**

1)



2)

