Transfer Learning for Smart Background Simulation at the Belle II Experiment

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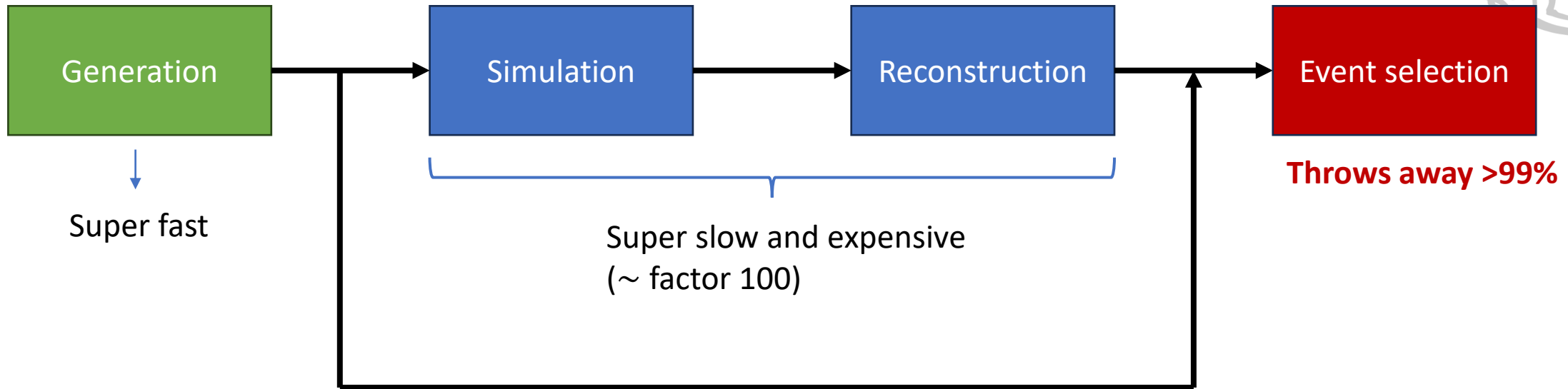EuCAIFCon 2025

The Problem

Generation

Super fast

Simulation → Reconstruction

Super slow and expensive
(~ factor 100)

Event selection

Throws away >99%

Shortcut?
→ **Not directly possible** because reconstructed quantities
unknown after generation

The Solution

Generation → Simulation → Reconstruction → Event selection

Super fast

Pass

Reject

Neural Net

Super slow and expensive (~ factor 100)

Throws away >99%

Will this event pass the event selection?
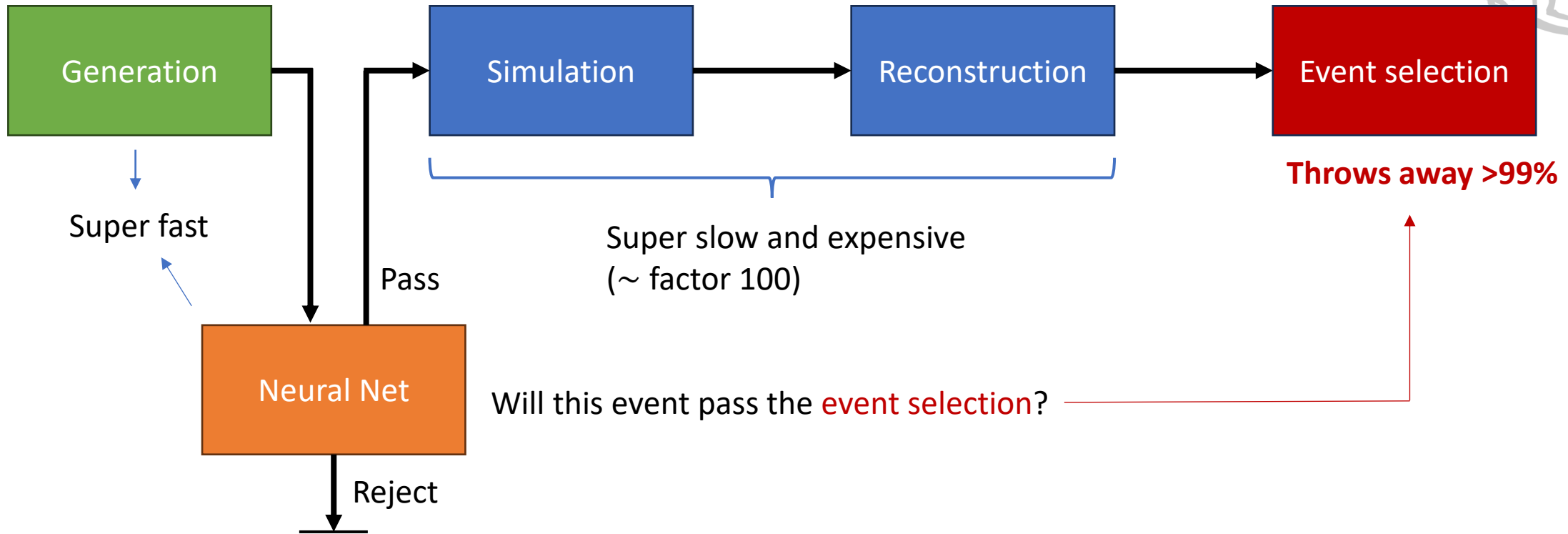
False negatives: **bias**?

Complicated inputs: **what architecture**?

And where is the **transfer learning**?

→ This and more at the poster session tomorrow :)