Simple Simulation of FCTS & Derandomizer

S. Luitz

SuperB General Meeting

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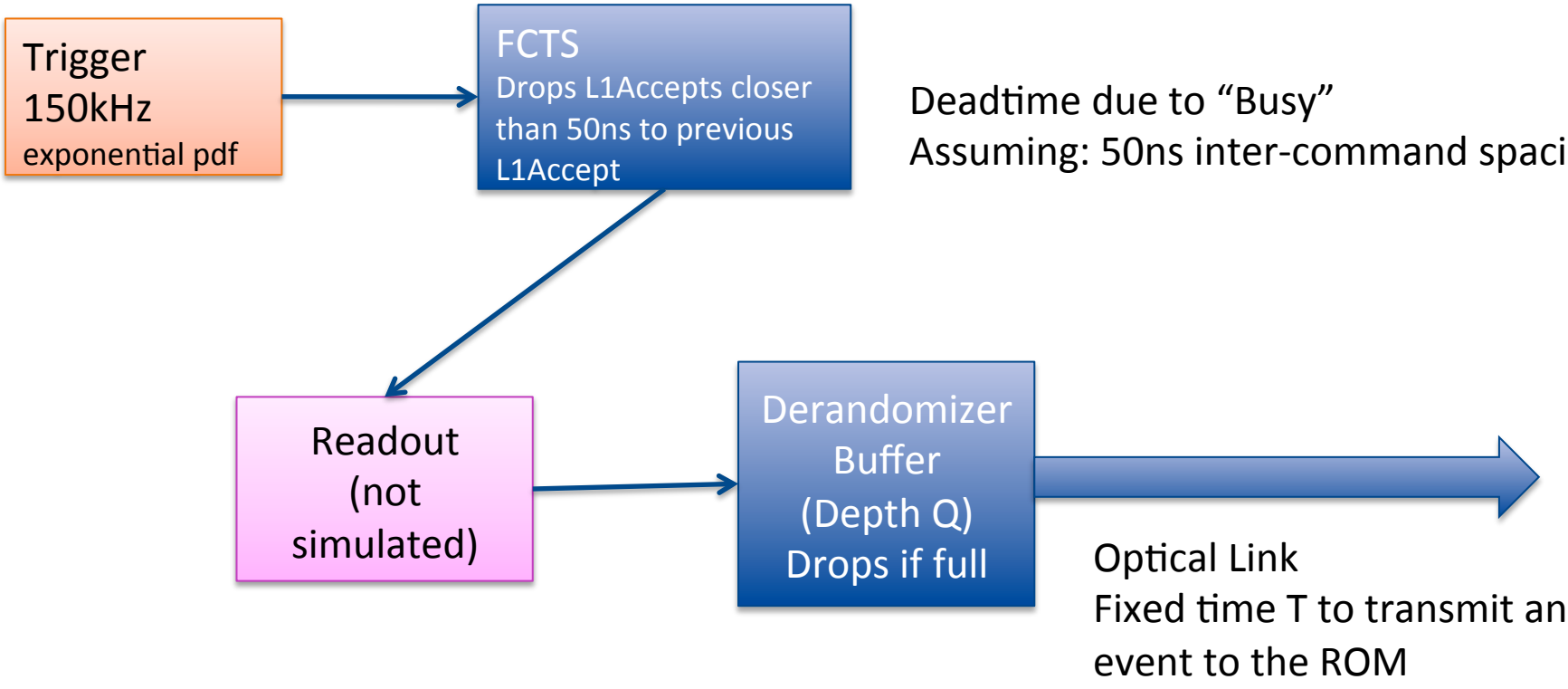
Simple Simulation of FCTS & Derandomizer

- Triggered (pun intended) by the discussions at and after the CERN ETD workshop
- How do L1 "intercommand spacing", derandomizer buffer depth and the time to transmit an event from FEE → ROM affect deadtime?
- Improved model: Don't transmit duplicate data for overlapping events

The Model



Note: Dropping events simulates a fast throttle

SimPy

- Discrete-event simulation "language" implemented as Python library
- Process-based, object-oriented

- Fairly easy to use
- Provides common primitives, e.g.
  - Stores ("queue")
  - Resource
- Internal simulated time base
- Many advanced features
- Monitoring & Reporting

- http://SimPy.SourceForge.net

```
class Drb(Process):
    def __init__(self,name):
       Process.__init__(self,name)
       if Param.DrbDepth > 0:
         self.waitingDrb=Store(capacity=Param.DrbDepth)
       else:
         self.waitingDrb=Store(capacity=1)
       self.DrbEmpty=Resource(capacity=1)

    def lifecycle(self):
      while True:
        yield get,self,self.waitingDrb,1
        currentL1A=self.got[0]
        yield hold,self,Param.DrbL1Time
        currentL1A.DrbDoneSignal.signal(self.name)
```

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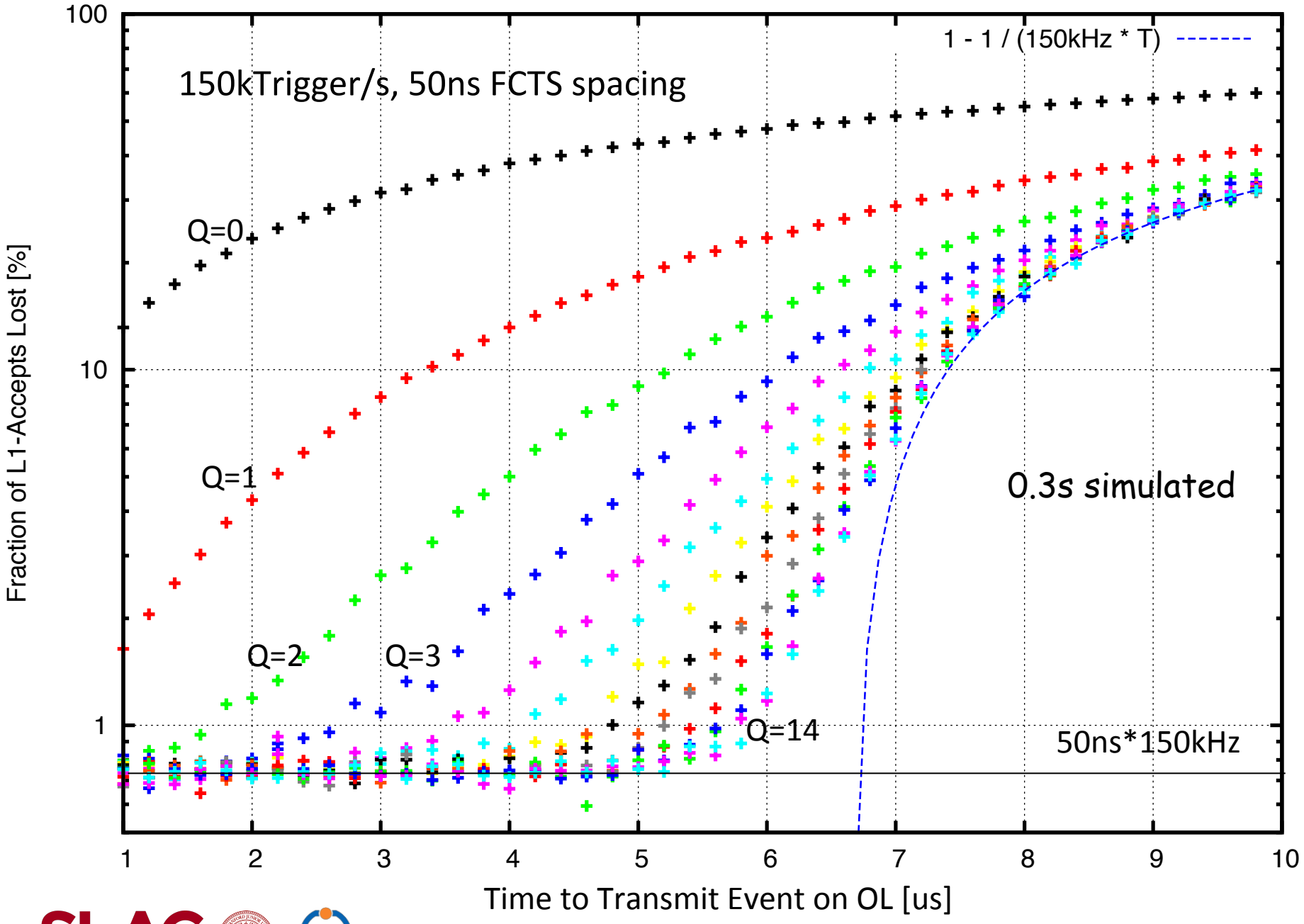

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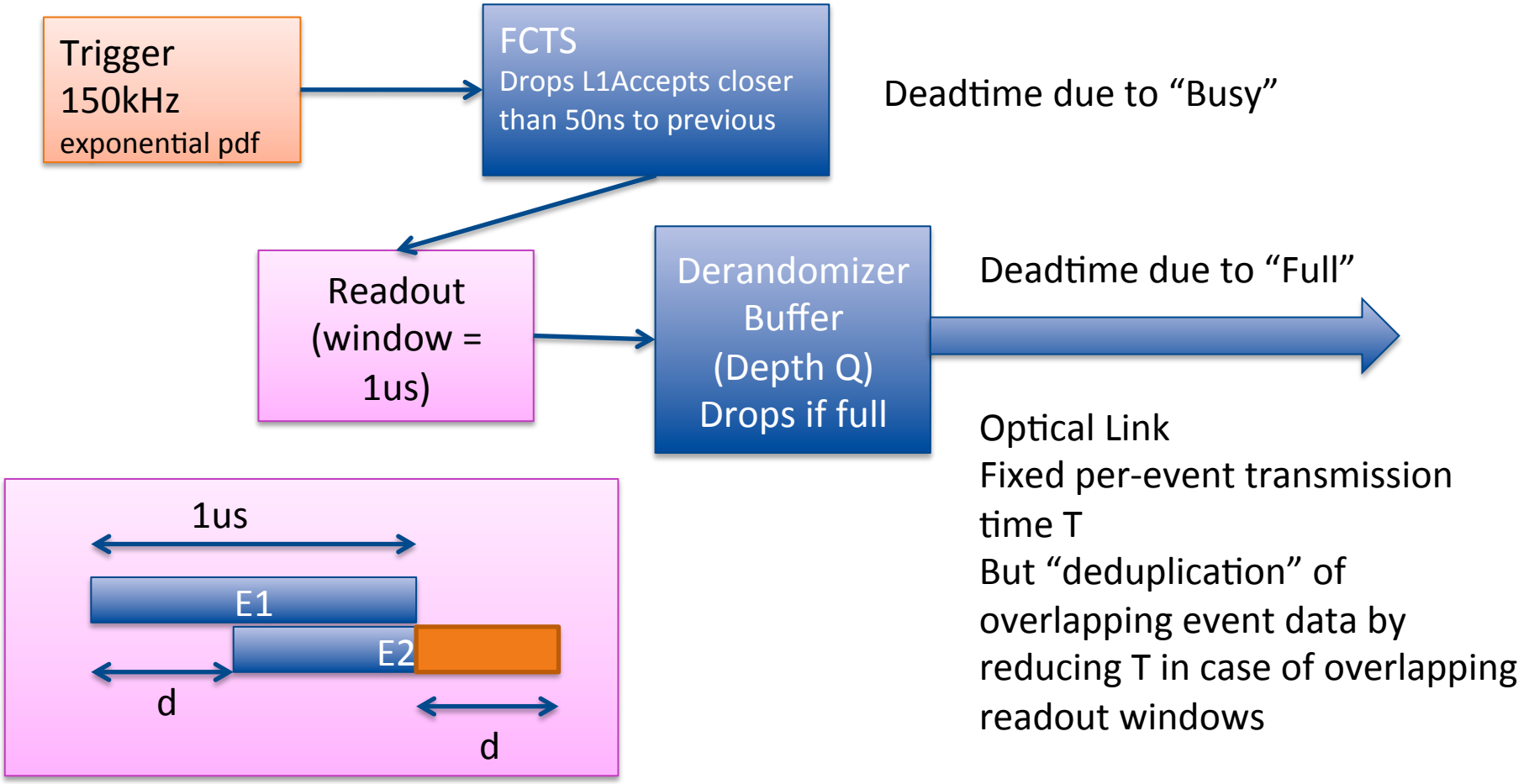
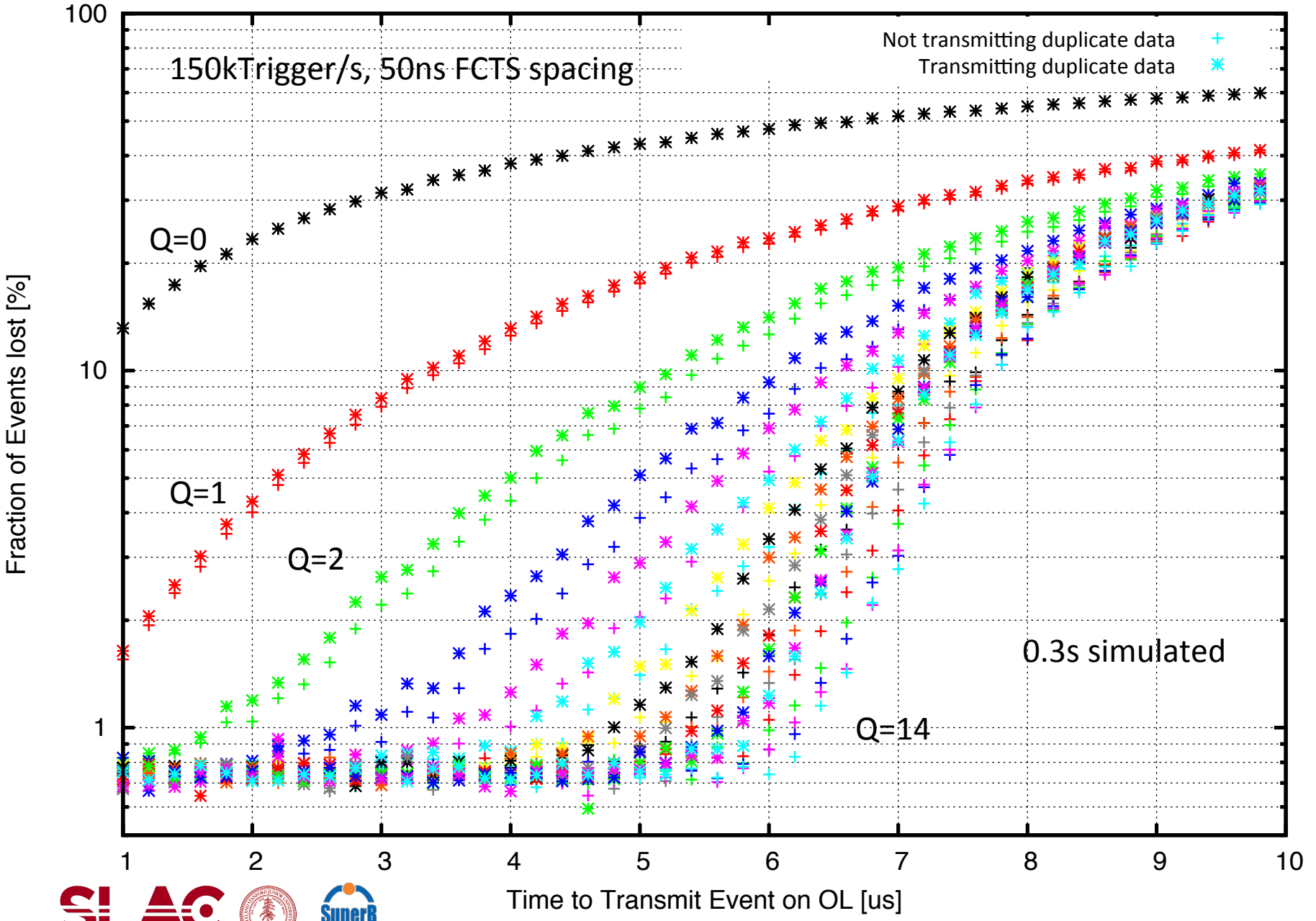
The Model with Overlapping Event Data Deduplication





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Conclusion & Next Steps

- Basic simulation illustrates the concepts
  - Functional model, not a detailed electronics simulation!
- Will need to plug in the realistic numbers
  - Minimum command spacing, readout window
  - Set a dead time goal (1% ?)
- More detailed electronics simulation
  - Jihane working on this (well advanced)
  - Compare results – validate models
  - Hope to present more at Elba meeting
- Better understanding and definition of throttle mechanism
  - "latency-free" emulation of "worst" FEE in FCTS
- Goal: Produce system-wide specification for maximum event size (bits/optical link) and derandomizer buffer depth(s)