

# Update on SciTil implementation in Pandaroot

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Wien, 1.12.2015

# Former Status

## SciTil in Pandaroot:

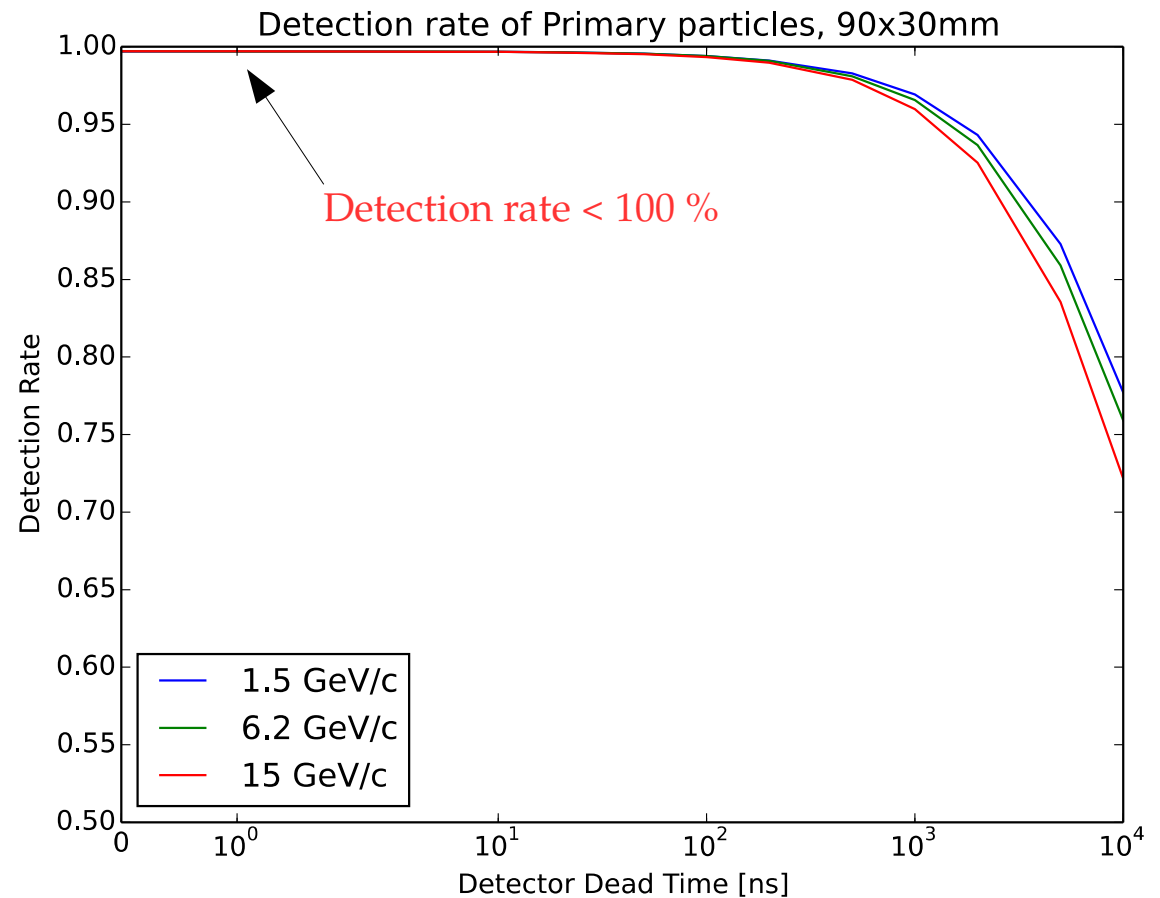
- updated to current project status
- Time based simulation ready to use

## Outlook:

- Using the framework to investigate
  - Event mixing
  - Detection efficiency
  - ...

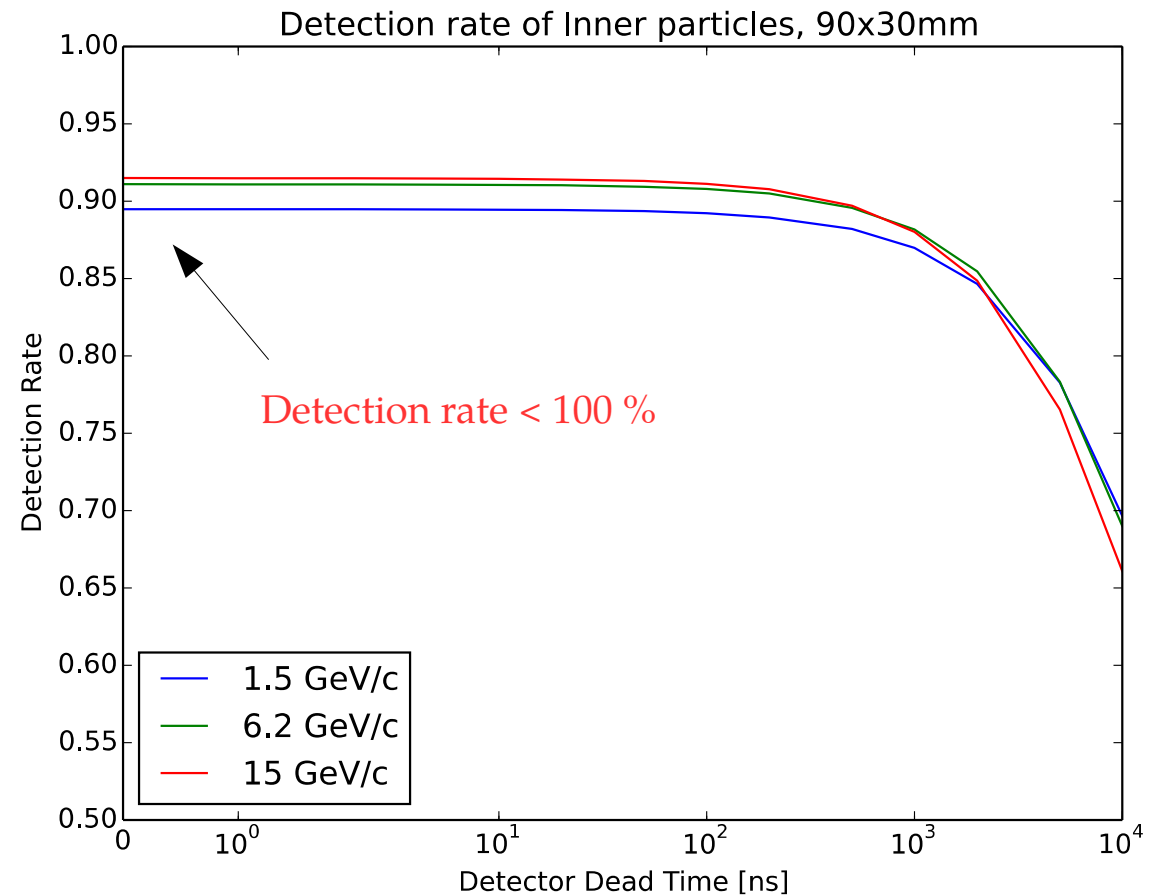
# Preliminary results

- Detection efficiency
  - Simulation parameters
    - DPM generator
    - $N_{\text{avg}} = 20$  MHz
    - $10^5$  events simulated
  - Perfect geometrical fill factor assumed
- Missing hits in perfect detectors



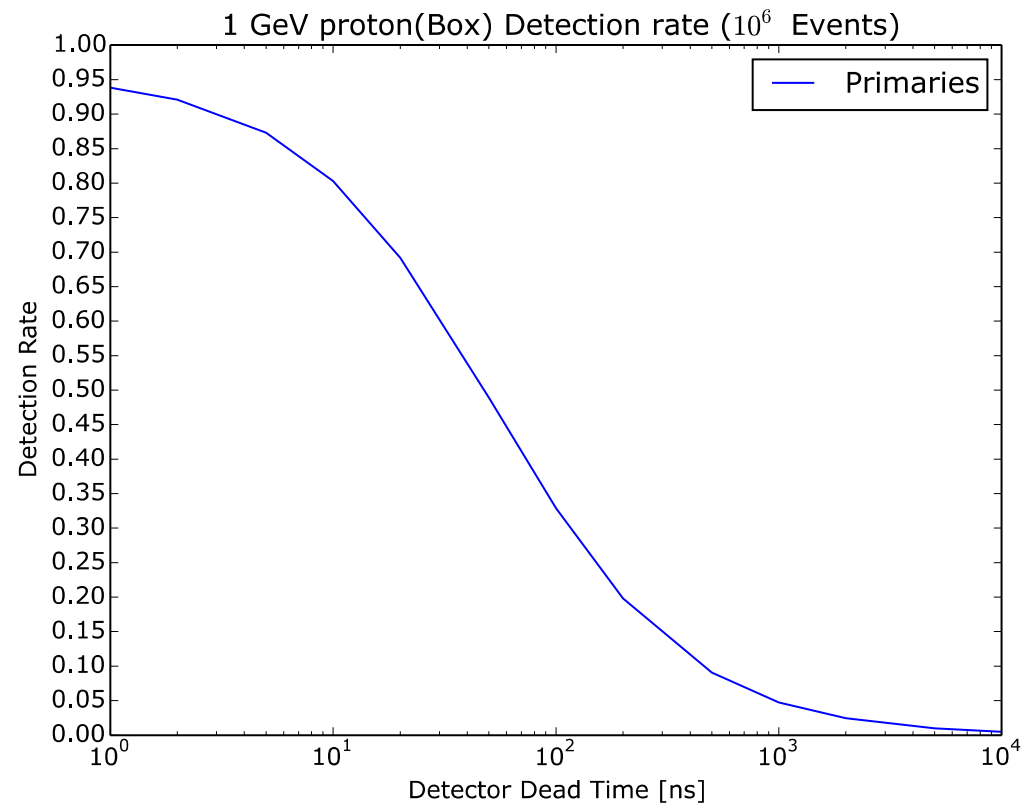
# Preliminary results

- Detection efficiency
  - Simulation parameters
    - DPM generator
    - $N_{\text{avg}} = 20$  MHz
    - $10^5$  events simulated
  - Perfect geometrical fill factor assumed
- **Missing hits in perfect detectors**



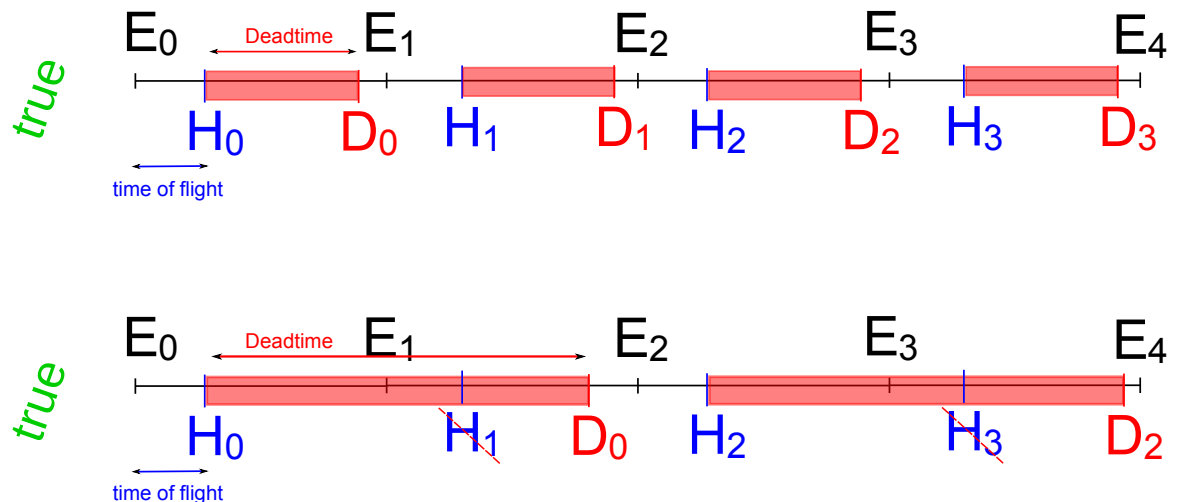
# Bug in time based simulation

- Simplified test setup
  - Box generator
  - 1 GeV/c Proton
  - Single Tile Target
  - $N_{\text{avg}} = 20 \text{ MHz}$
  - $10^6$  events simulated



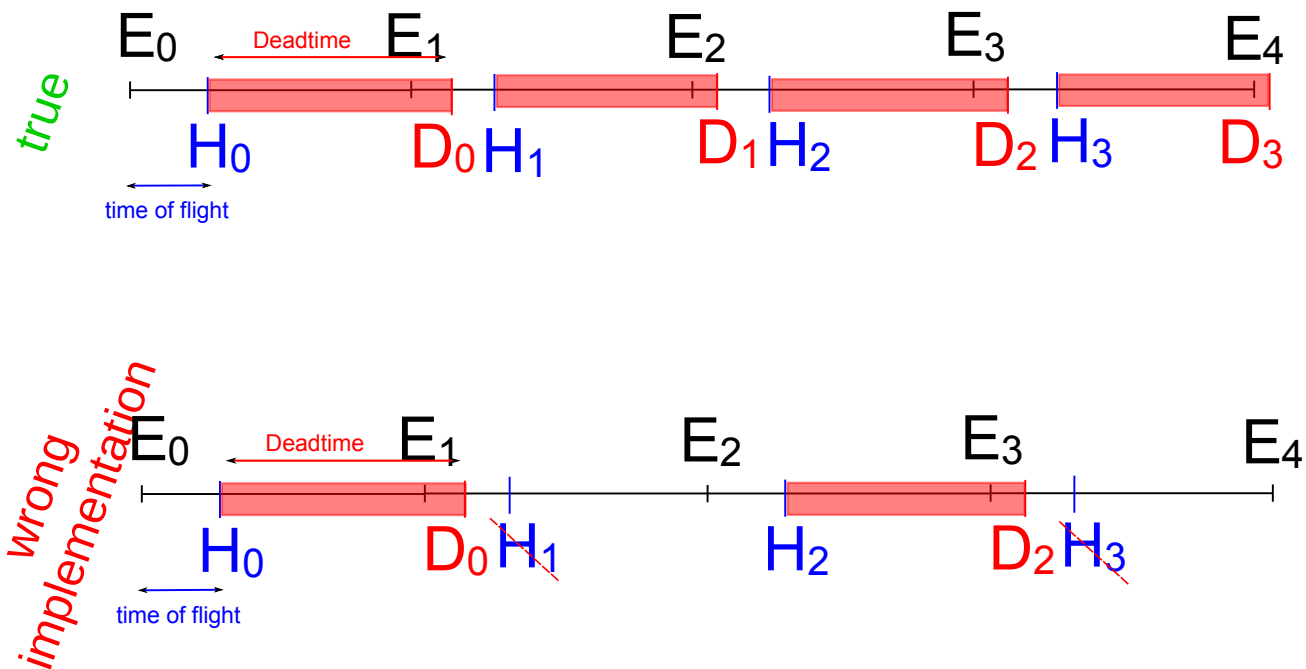
# Bug in time based simulation

- Checking the code for time based simulation
  - Buggy algorithm for dead time treatment
  - Loss of Hits



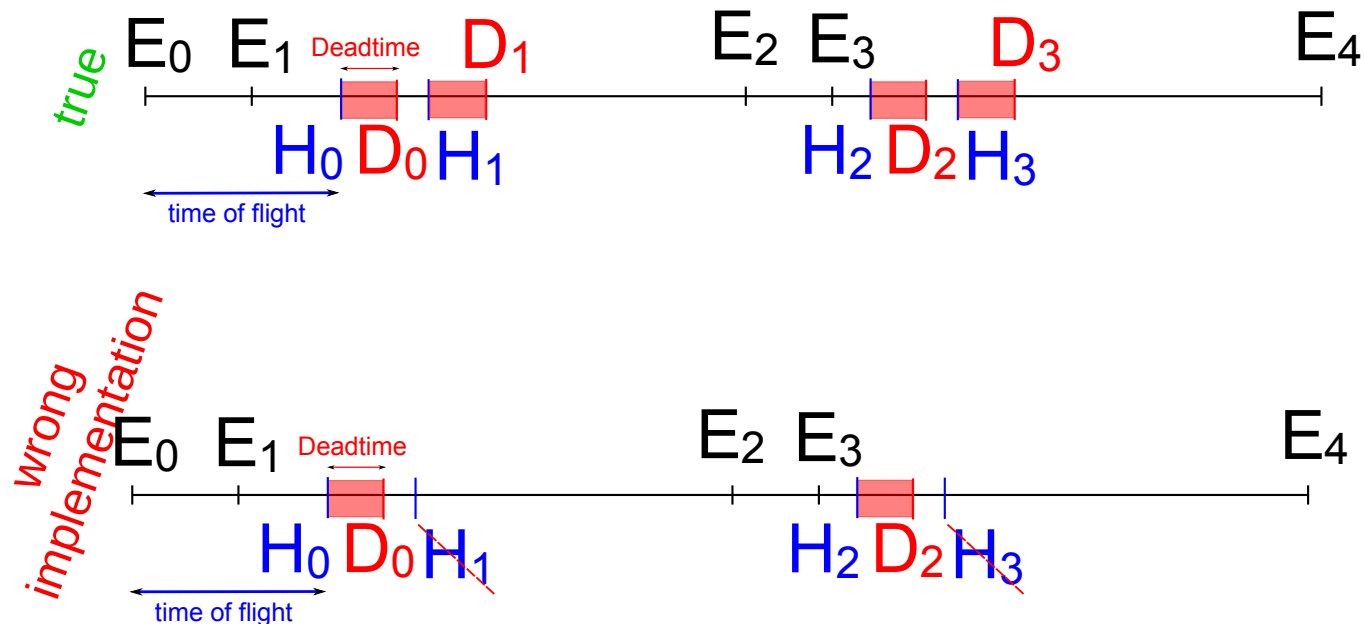
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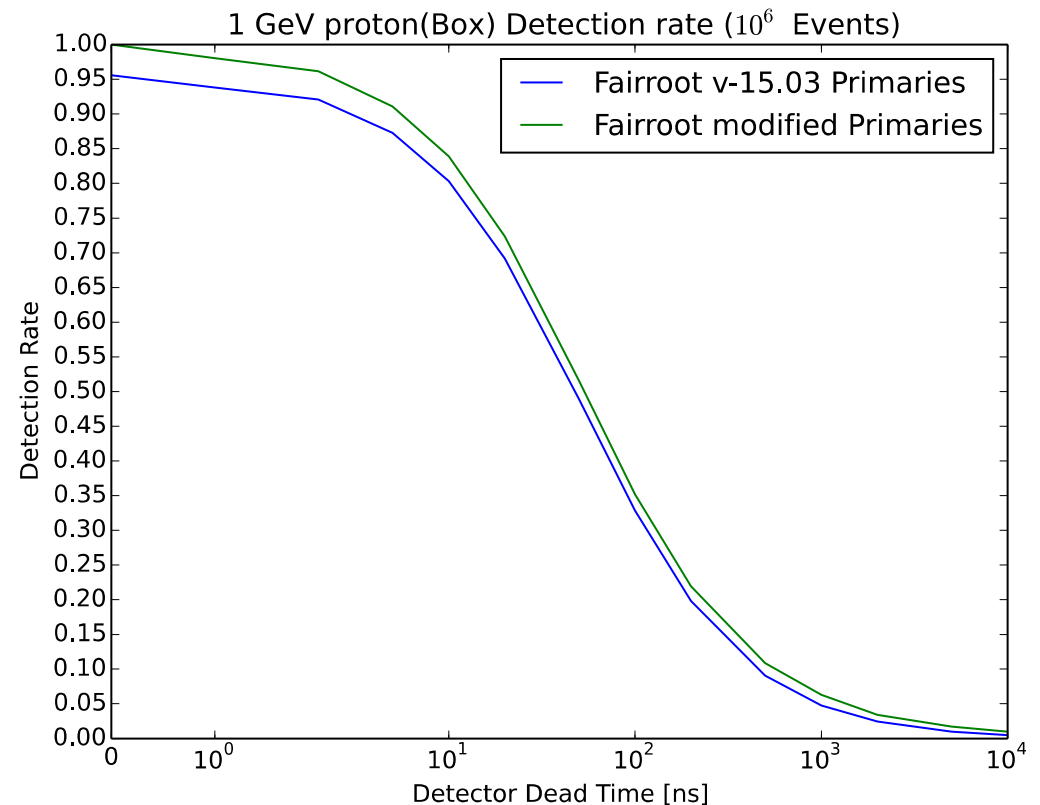
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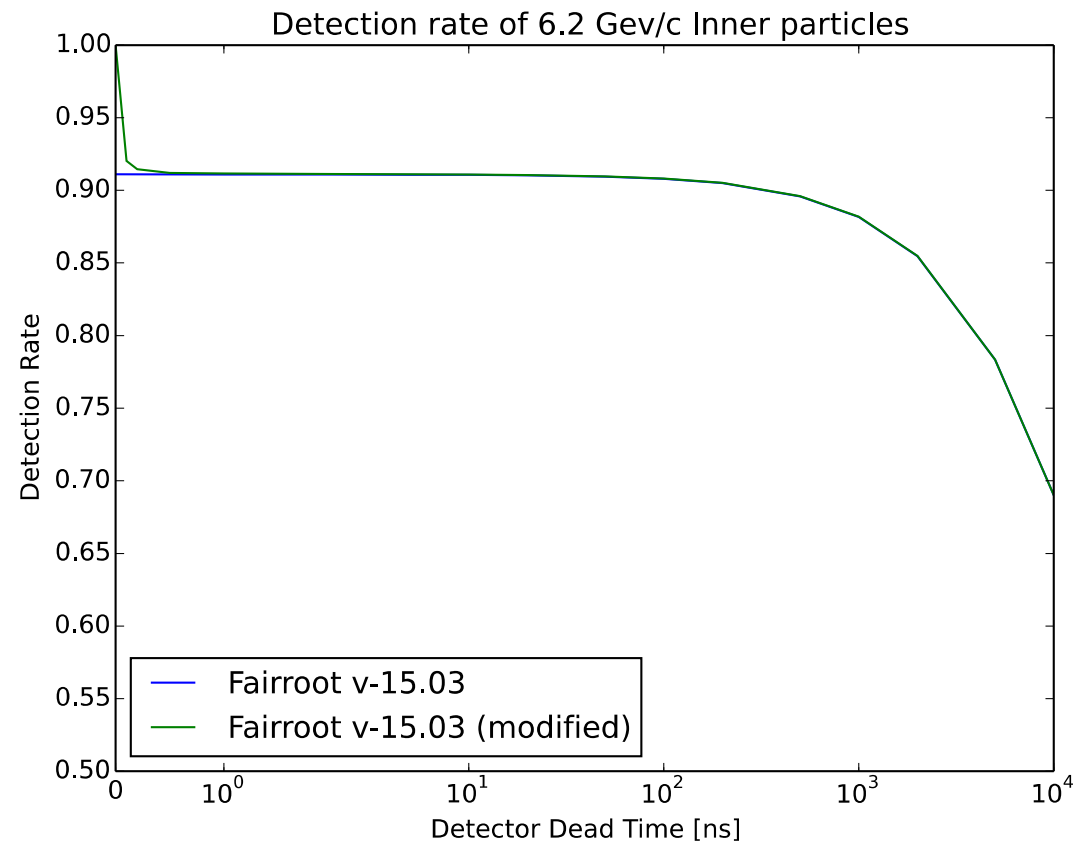
# Bug in time based simulation

- Error located in the FAIRROOT package
  - All Pandaroot versions affected.
  - probably other simulation frameworks of FAIR experiments are affected.
- Bug has been fixed locally
- Bug fixing in the repository difficult due to missing permissions
  - I'm in contact with Tobias Stockmann



# Bug in time based simulation

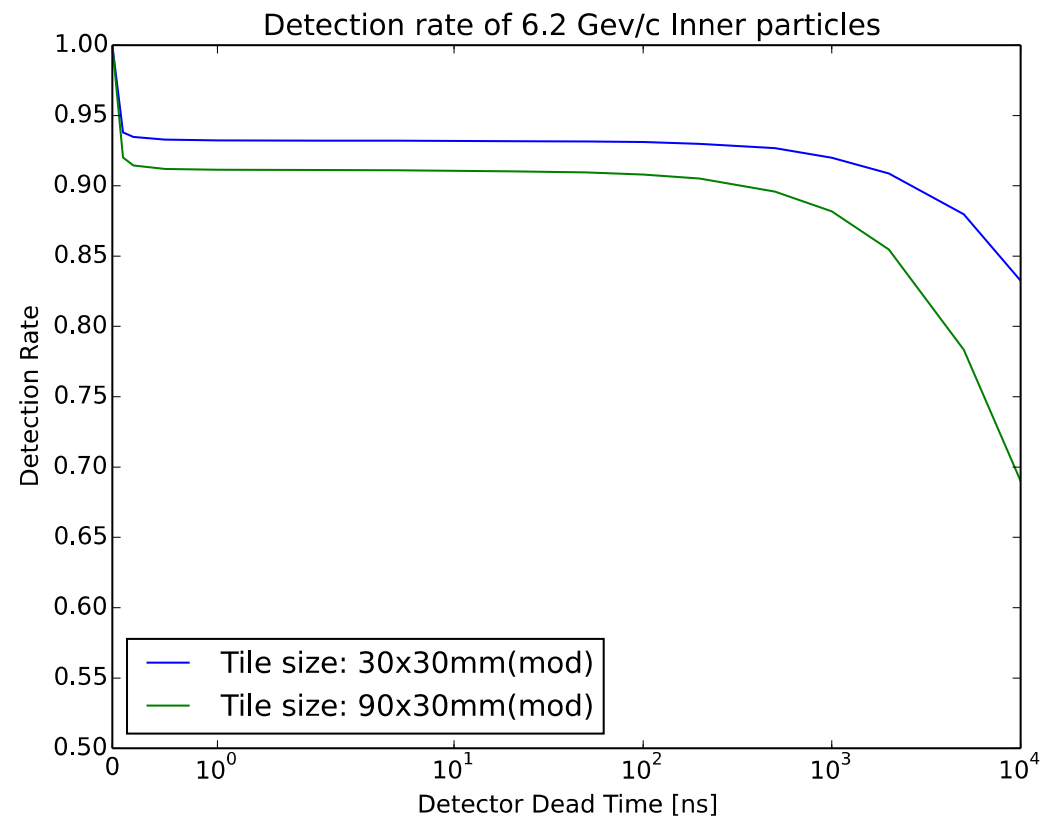
- Simulation parameters
  - DPM generator
  - $N_{\text{avg}} = 20 \text{ MHz}$
- Perfect geometrical fill factor assumed
- Effect seems negligible for realistic parameters
- Effect on specific channels not known!



# Efficiency for different tile sizes

## Preliminary

- Simulation parameters
  - DPM generator
  - $N_{\text{avg}} = 20$  MHz
  - Modified Fairroot
- Perfect geometrical fill factor assumed

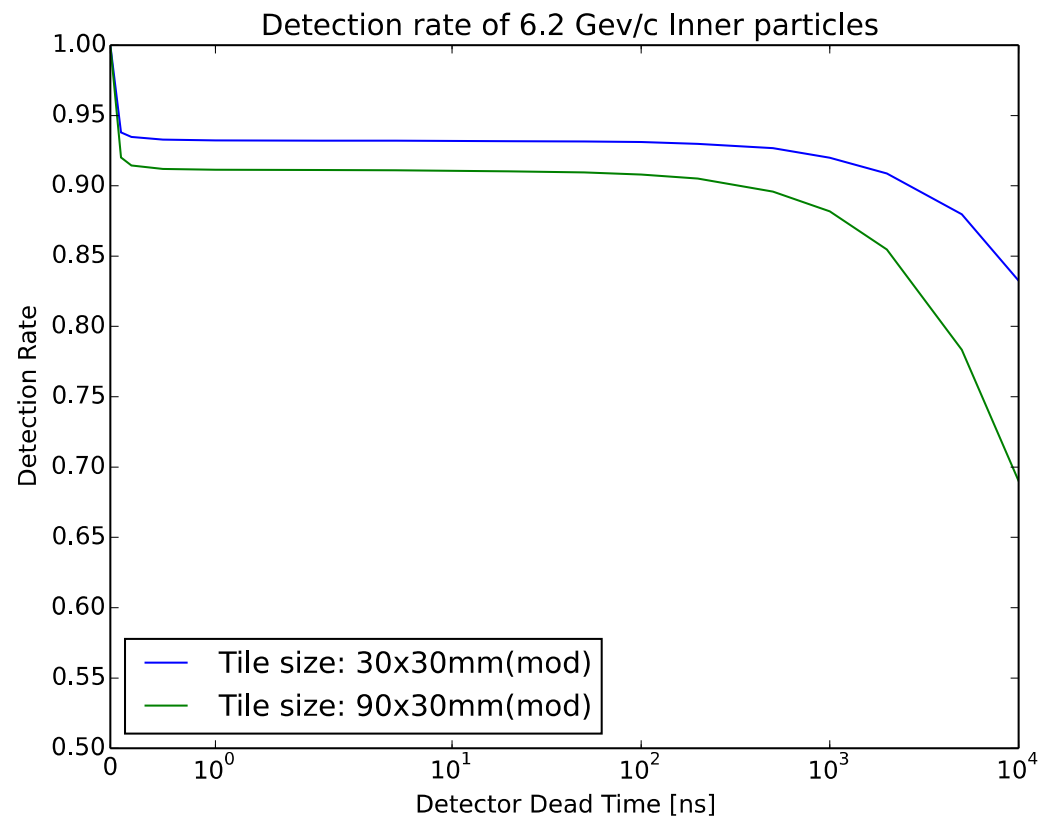


# Efficiency for different tile sizes

## Preliminary

### Outlook:

- Realistic event rates
- Realistic FEE
  - TOF PET Asic chip
  - Buffer for 4 Hits
  - SiPM / scintillator dead time as limiting factor
- Saturation level will probably not change



# Summary and Outlook

- Bug in time based simulation
  - Fixing in progress
- Implementation of more realistic FEE
  - Review Efficiency
  - Correct event rates
- Simulation of geometrical fill factor