Status of WATCHMAN Calibration Requirements Study

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Warwick COVID Meeting, 2020-10-13

Light Injection System for WATCHMAN Calibration

Based on a system designed for Hyper-K and installed in Super-K

Optical system may be used for:

      Gain

      Timing

      Monitoring target medium optical properties

      Reflections

Real time monitoring as well as data for offline analysis

What are WATCHMAN Requirements?

WATCHMAN is different to Hyper-K and Super-K

 Research goals

 Tank size

 Maybe WBLS?

May lead to different optimisations for the optical calibration system:

 Number and placement of sources,

 Absolute light levels injected,

 Timing and spatial light profile of sources
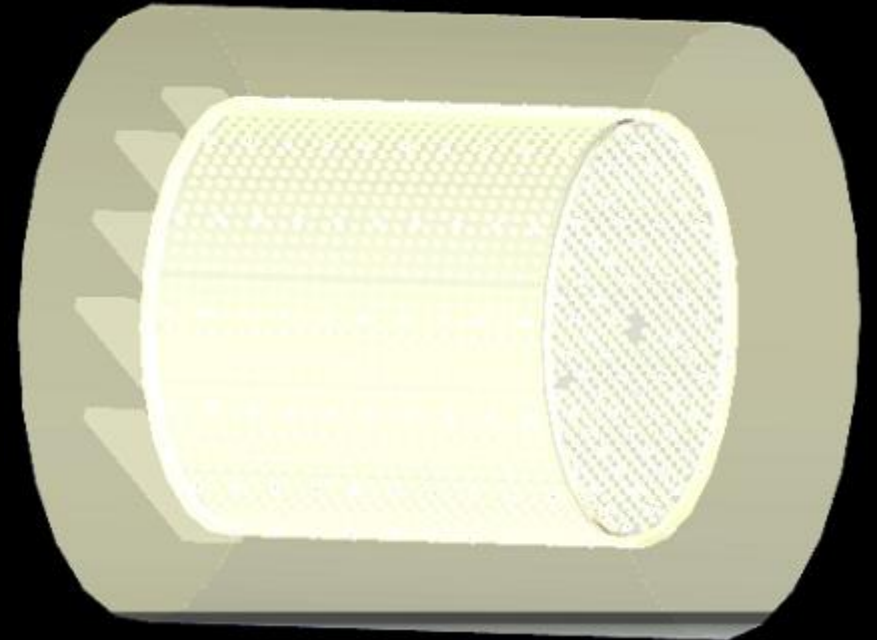
Analysis Plan

Aim: Study the impact of optical properties of the medium on systematic uncertainties for WATCHMAN analysis

Plan:

- ☐ Simulate WATCHMAN with varied water properties

- ☐ Evaluate the impact on the reconstruction

- ☐ Run the standard WATCHMAN sensitivity analysis on these data sets

- ☐ Derive target precision on water properties required to meet WATCHMAN sensitivity goals

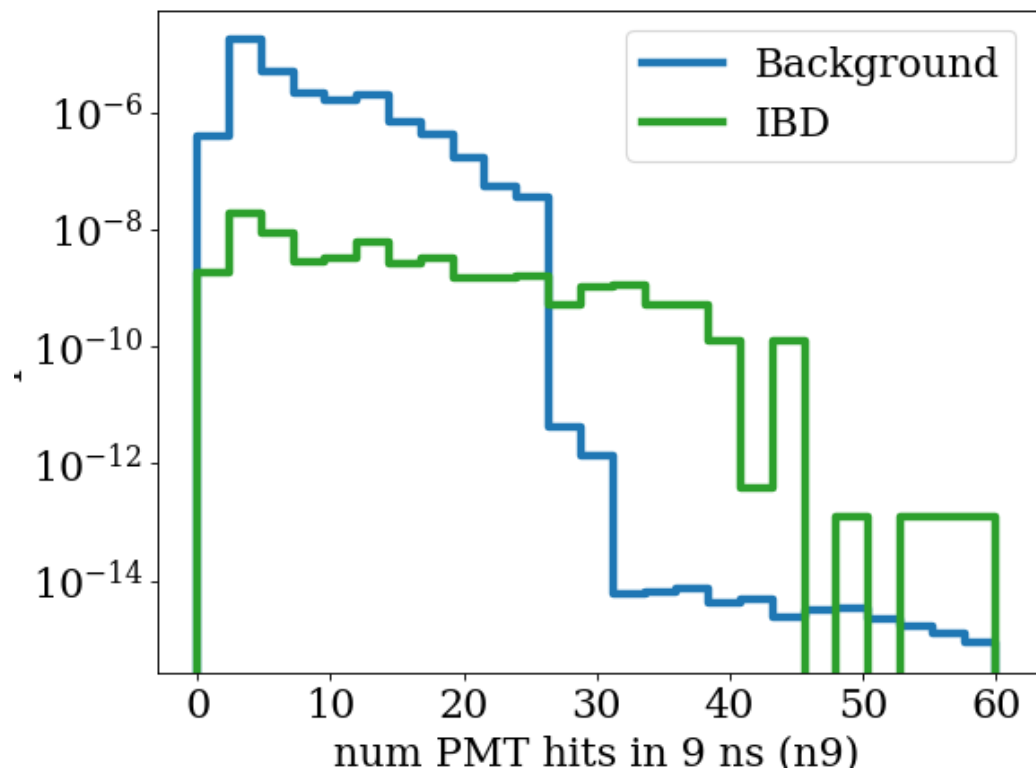- ☐ Feed these requirements back into calibration system design

Recent Activity

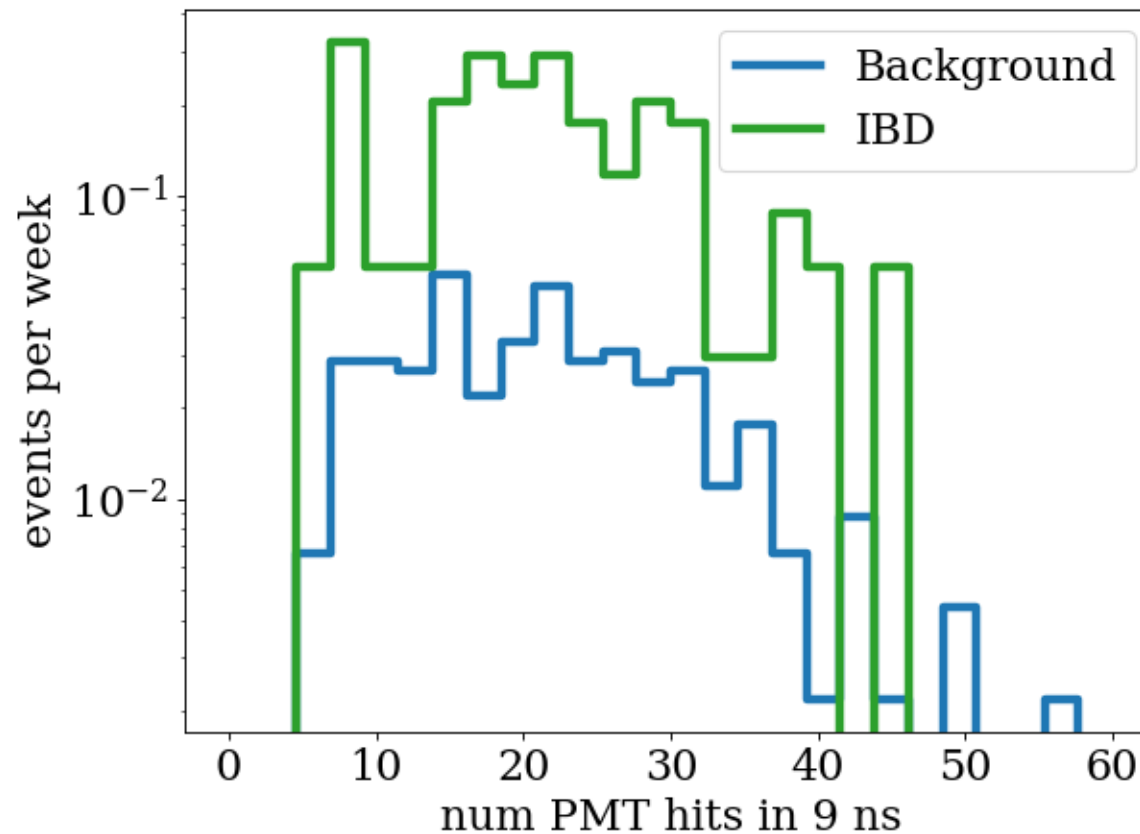Spending a lot of time getting to grips with the WATCHMAN software stack…

Fixed Issue with excessive backgrounds reported in a previous simulation meeting
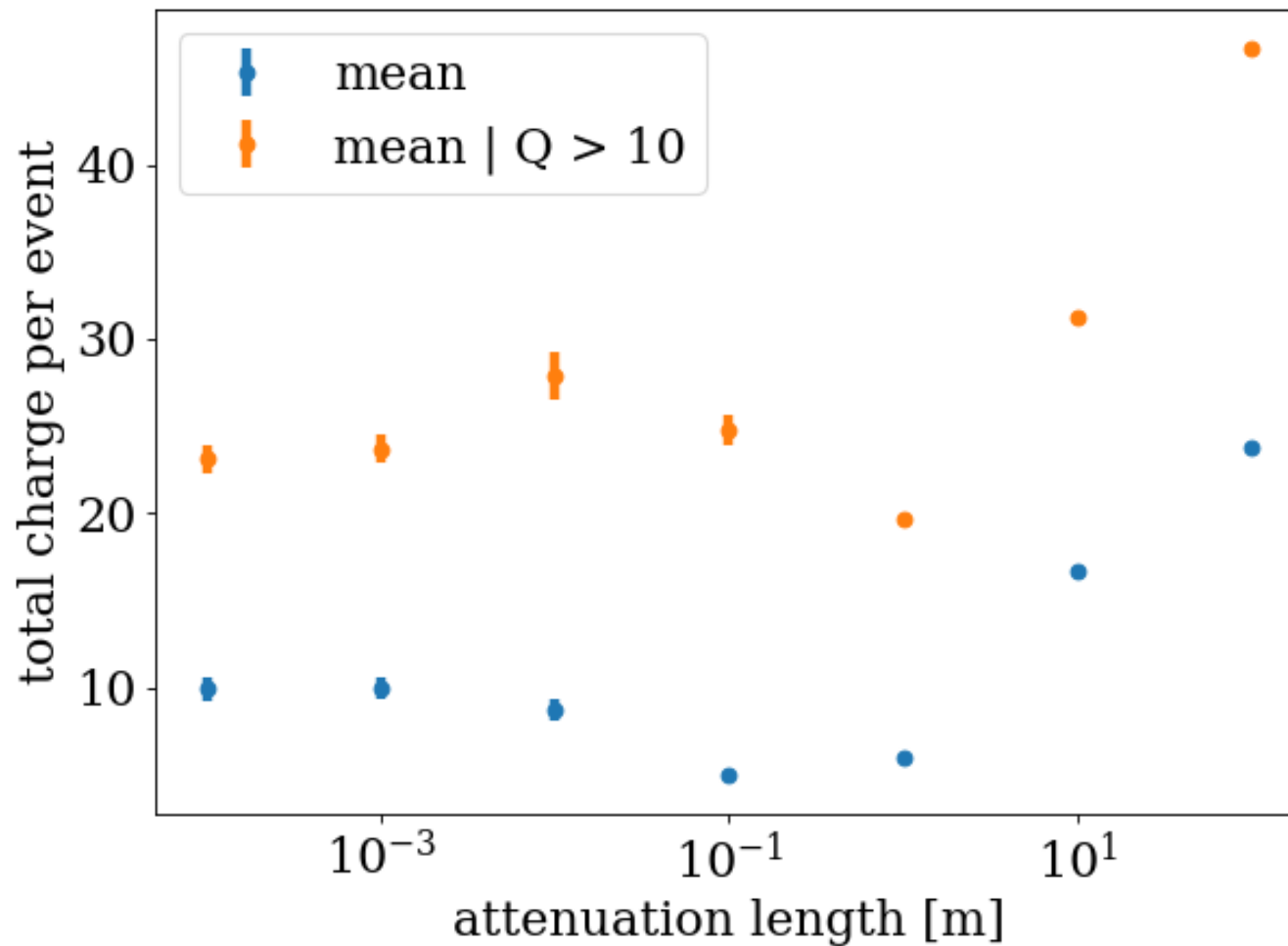
WARWICK
THE UNIVERSITY OF WARWICK

Previous Result

New Result

2020-08-12
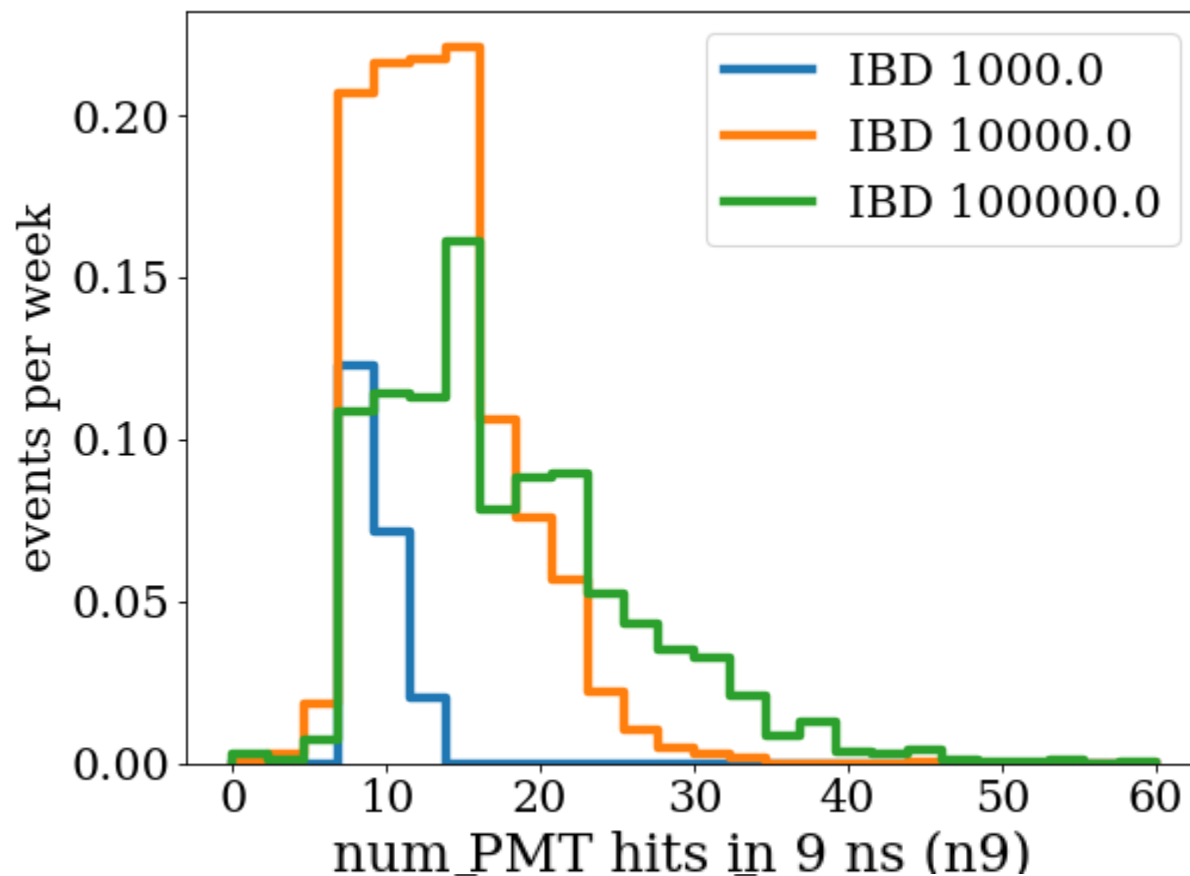
(*Missing some backgrounds. Current simulation is not stable.)

Demonstration of Successfully Modifying Monte Carlo Water Parameters

Evaluation of the Impact of Water Properties on Reconstruction is in Progress

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Backup