

## MEMORANDUM

**To:** ALCON

**From:** Peter Fisher

**Subject:** Pile-up and accidental coincidences

**Date:** November 7, 2017

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1. Events occur with an average rate  $r$  and are detected with a detector that has an integration time  $\Delta$ . Given that an event has occurred, what is the probability a second event occurs in the same integration window? This is just  $r\Delta$ . A window with one event in it occurs at a rate  $r$ , so the rate at which there are two events in one integration window is  $r^2\Delta$ .
2. If there are two kinds of events called type 1 and type 2, which are detected in a detector with integration time  $\Delta$ , following the same argument, the accidental coincidence rate is  $r_1r_2\Delta$ .