Addendum

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3.4 Continuum Background Energy Spectrum

Using the best fit parameter values the energy spectrum of the continuum background was calculated for the ToF range from channel 107 to channel 130. In Fig. 9 a comparison of the continuum background intensity derived from $\mathrm{ToF_{II}}$ data (top, which is identical to the bottom of Fig. 7 in `COM-RP-MPE-DRG-165`) and from $\mathrm{ToF_{III}}$ data is given for Etot below 8 MeV. As was to be expected from Sec. 3.3, the parabolic models systematically yield the highest and the exponential models systematically yield the lowest continuum background intensities. In remarkable contrast to the forward peak energy spectrum (see Fig. 5) the instrumental lines are at best weakly present in the continuum background spectrum (it may well be that any deviation from a pure, smooth continuum is due to systematic errors in the fitting procedure). *This indicates that the physical processes reponsible for the background in the forward peak and for the continuum background are quite different.* The systematical differences in the continuum background intensity due to the different models are about the same as those given in Sec. 3.3 for the forward peak intensity.

To assess the effect of the increased activation of COMPTEL after the reboost on the "average Phase 1, 2 and 3" continuum background spectrum is compared to the "average Phase 2, 3, 4 and 5" continuum background spectrum in Fig. 10 (in analogy to Fig. 7). Again the behaviour of the continuum background and the forward peak are strikingly different. The continuum background intensity above about 2 MeV seems to be constant (the negative intensity values in the bottom panel between 2 and 5 MeV are probably due to systematic errors in the fitting procedure). The increase of the continuum background below 2 MeV could be due to longlived activation or an increased intensity of the prompt continuum background. The additional continuum background component shown at the bottom panel of Fig. 10 is a featureless exponential or power law spectrum - strongly suggesting a continuum source.

In summary, these findings are consistent with the assumption that the continuum background is a result of continuum processes only and free of instrumental lines. In particular, these results are consistent with Rob van Dijk's "two-photon event" hypothesis, which is described in Chapter 3 of his PhD thesis.

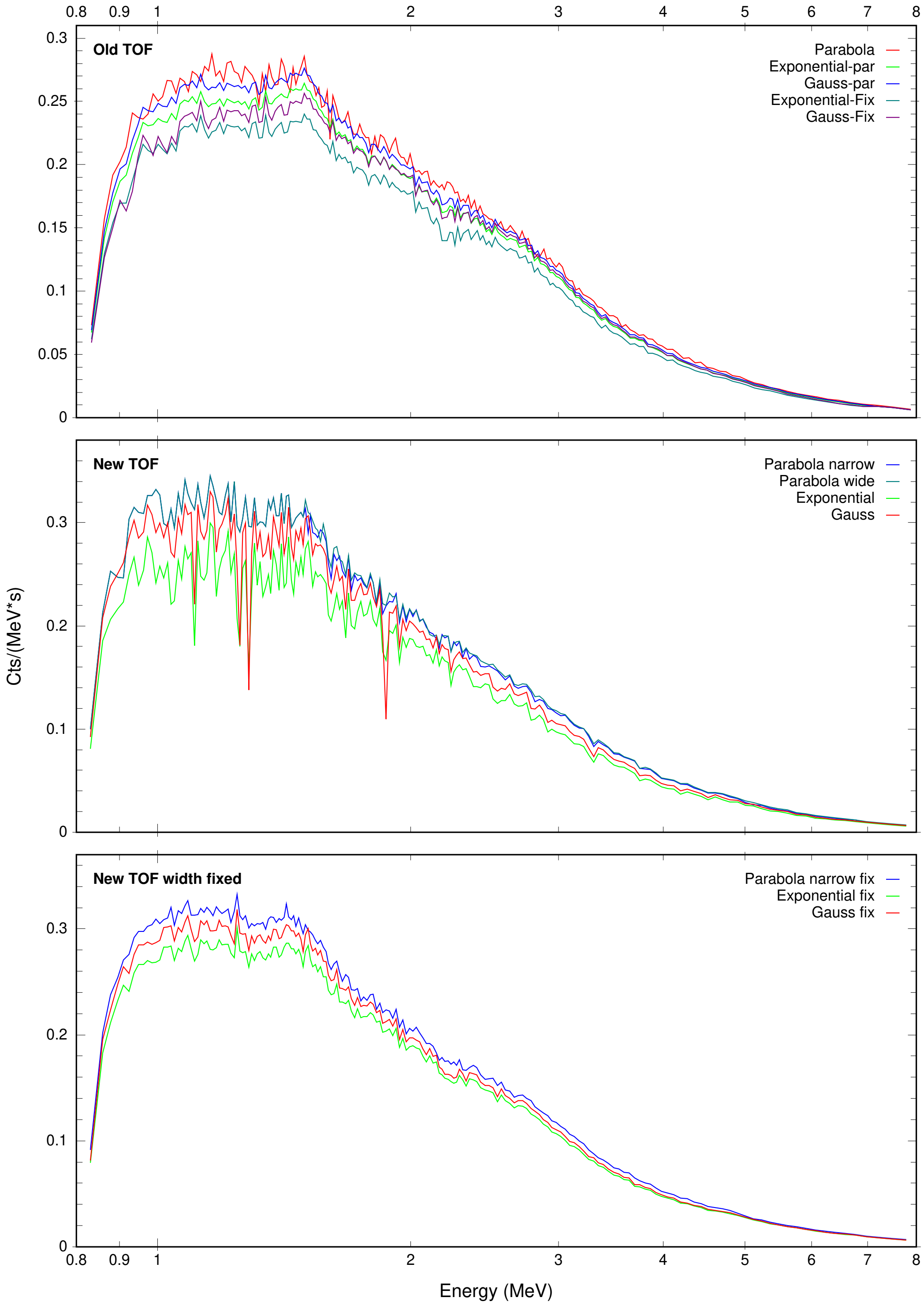

Figure 9: *A comparison of the continuum background intensity from 0.8 MeV to 8 MeV derived from* ToF_{II} *data (top) and* ToF_{III} *data (middle and bottom).*

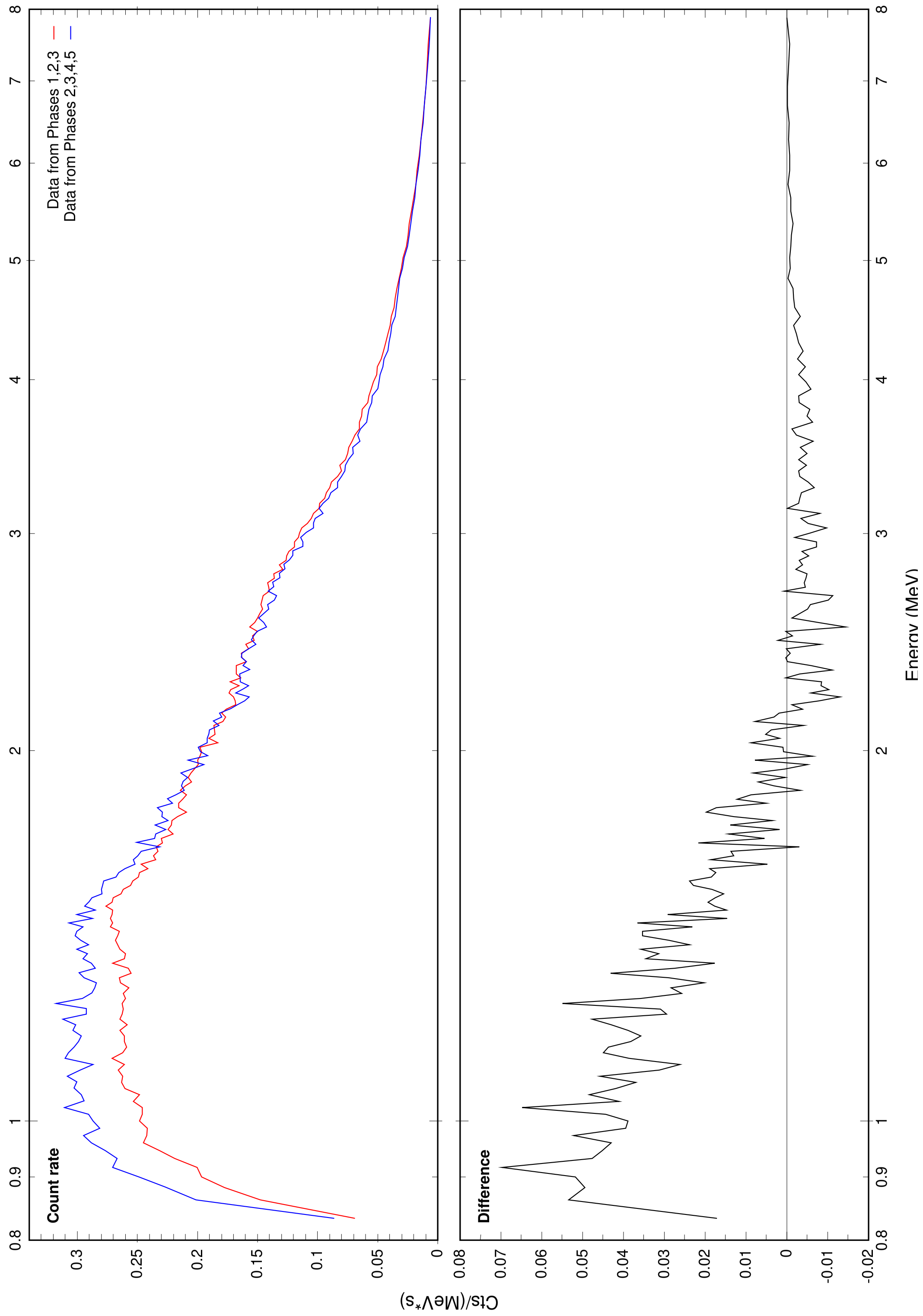

Figure 10: *A comparison of the continuum background intensity from 0.8 MeV to 8 MeV derived from* $\mathrm{ToF_{II}}$ *data (which consists of OPs from Phases 1, 2 and 3) and* $\mathrm{ToF_{III}}$ *data (which consists of OPs from Phases 2, 3, 4 and 5).*