DIFFERENTIATION OF NEUTRON AND GAMMA RESPONSE FOR EJ-301 DETECTOR AT LOW ENERGIES

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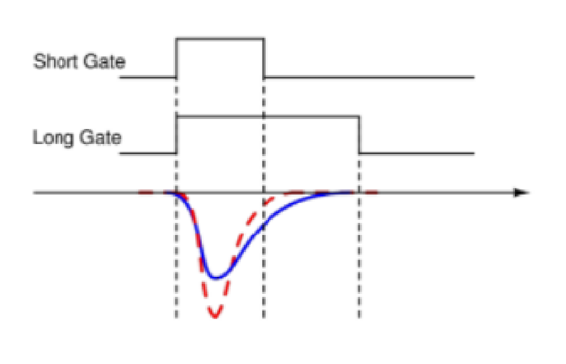

Short gate and long gate for two chosen pulses[2]

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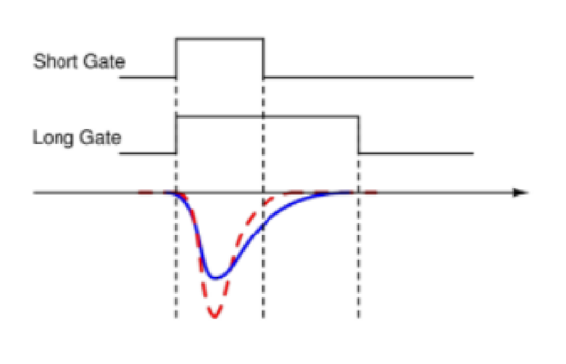

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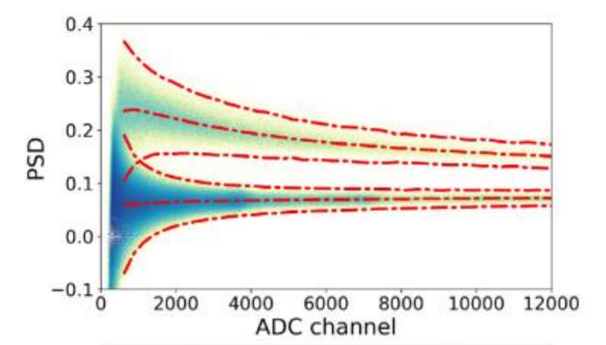

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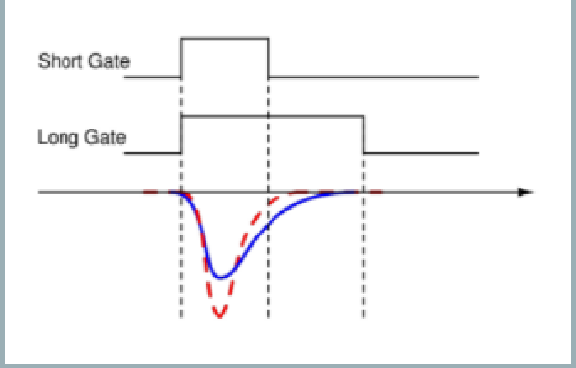

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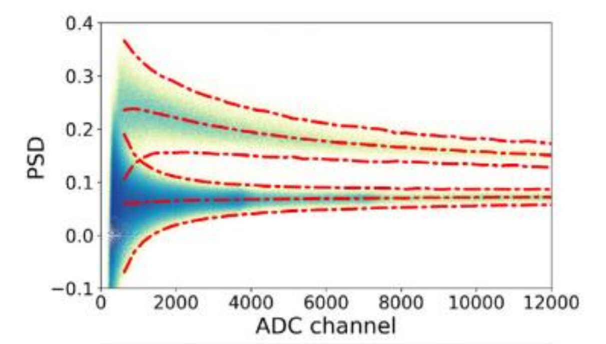

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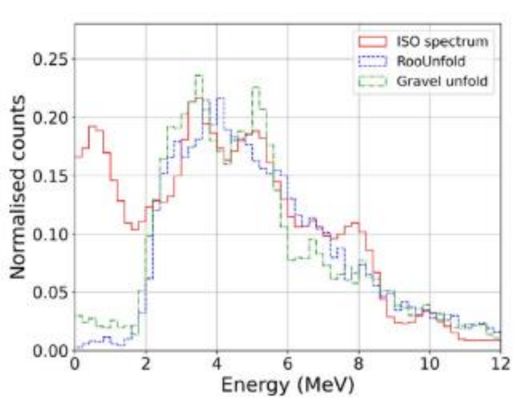

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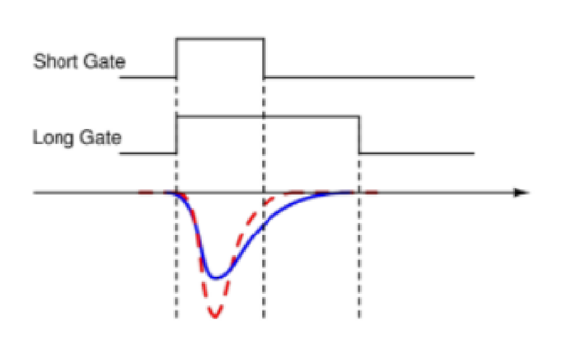

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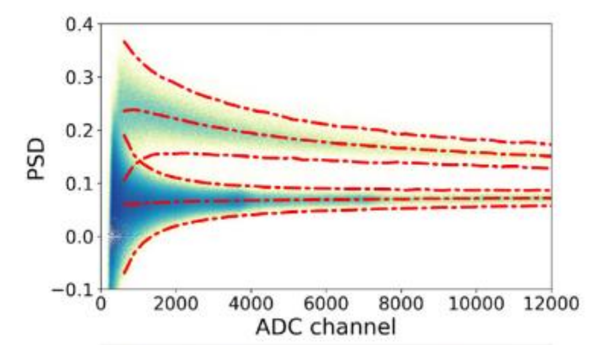

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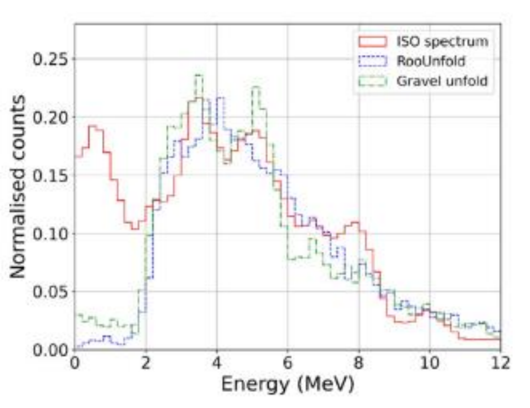

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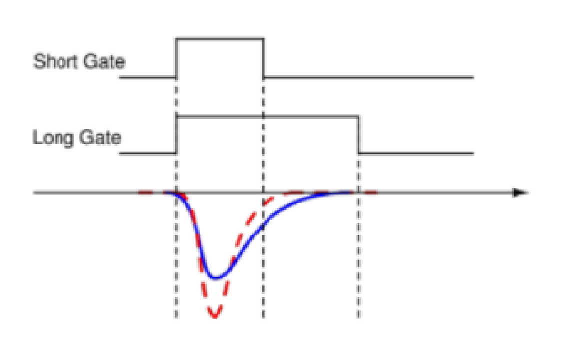

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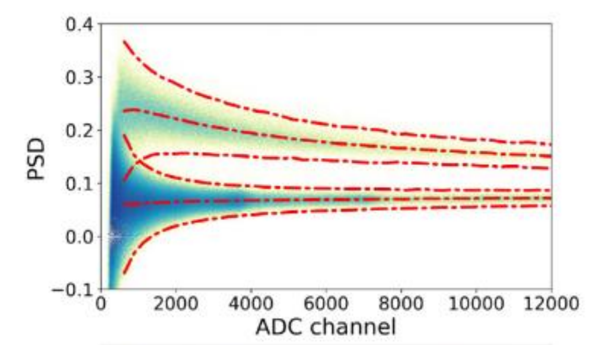

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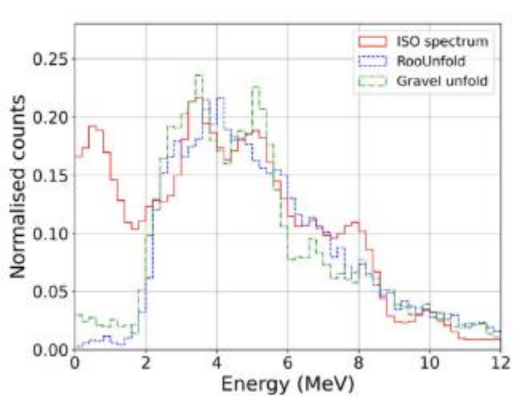

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BASELINES

- To gain a thorough understanding of the physical phenomenon that govern our project.
- To take additional experimental data and assemble a template of pulse shapes for different ADC Channels.
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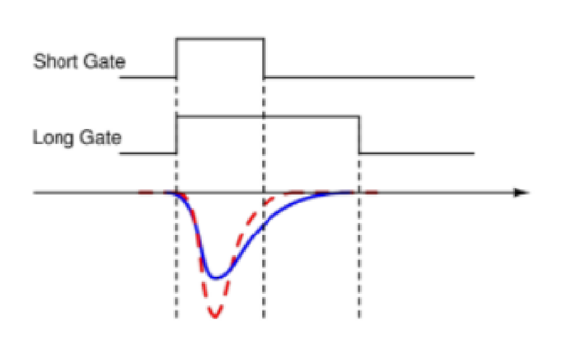

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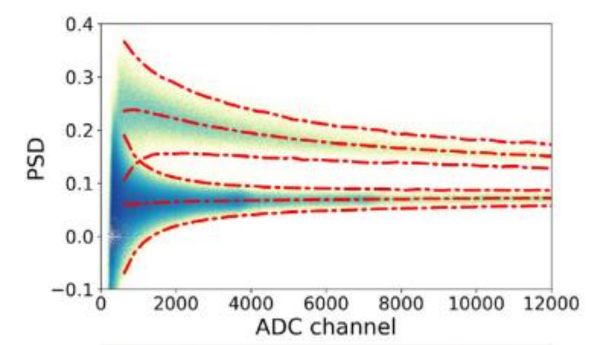

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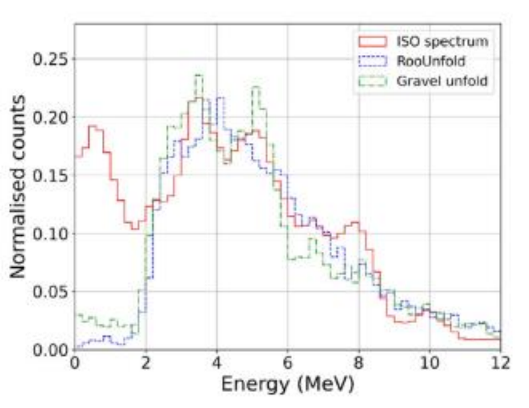

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- We plan on covering the first two baselines by the mid-semester examination.
- Both teammates will contribute towards all baselines since all of them are inter-dependent.
- We have access to the dataset used for PSD and unfolding used to plot the previous figures, for both neutron and gamma signals.

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RELEVANT PAPERS

- S. Das, V.K.S. Kashyap, B. Mohanty, Energy calibration of EJ-301 scintillation detector using unfolding methods for fast neutron measurement, Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment, Volume 1042, 2022, 167405

- Chen, Y., Chen, X., Lei, J. *et al.* Unfolding the fast neutron spectra of a BC501A liquid scintillation detector using GRAVEL method. *Sci. China Phys. Mech. Astron.* 57, 2014, 1885–1890

- Laurens van der Maaten and Geoffrey Hinton. “Visualizing Data using t-SNE”. In: Journal of Machine Learning Research 9 (2008), pp. 2579–2605.

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[1] source: S. Das, V.K.S. Kashyap, B. Mohanty, Energy calibration of EJ-301 scintillation detector using unfolding methods for fast neutron measurement, Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment, Volume 1042, 2022, 167405

[2] source: S. Das, Simulating the response of a liquid scintillation detector to gamma and neutrons, National Institute of Science Education and Research, Bhubaneswar, 2021