Accuracy of Q_{VEM}^{pk} fit for UB and UUB

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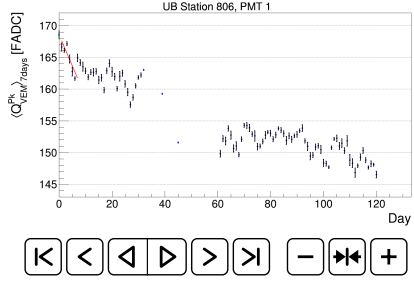
February 28, 2022

How the moving window works

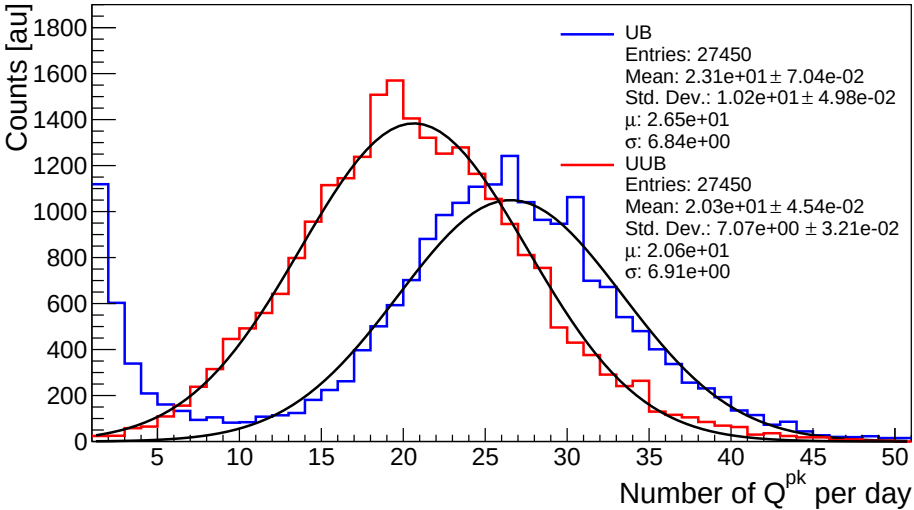
The goal: To choose the more stable 7-days in a row for fitted Q^{Pk}_{VEM}.

1. An $\langle Q^{Pk}_{\mathrm{VEM}} \rangle$ is calculate per day, then a first 7-day-series of $\langle Q^{Pk}_{\mathrm{VEM}} \rangle$ is built.
2. A linear fit is applied to the 7-day-series, and the respective slope and χ^2 are stored.
3. A new $[\text{7-day-series}]_1$ is built by replacing the seventh day in previous $[\text{7-day-series}]_0$ by next day.
4. A check for continuity is applied, i.e. if 7 days are not consecutive a new series is built, e.g. if series *i* has a discontinuity in day 3 jumping to day 5, a new 7-day-series is calculated from day 5.



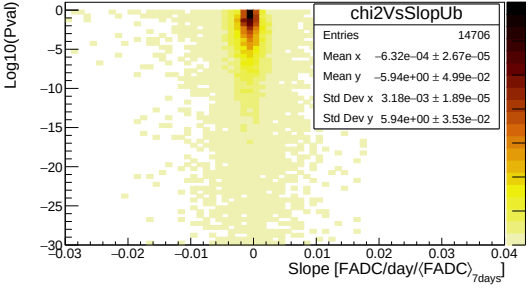
It is possible to see how the average $\langle Q^{Pk}_{\mathrm{VEM}} \rangle_{\mathbf{7days}}$ is moving leftward.

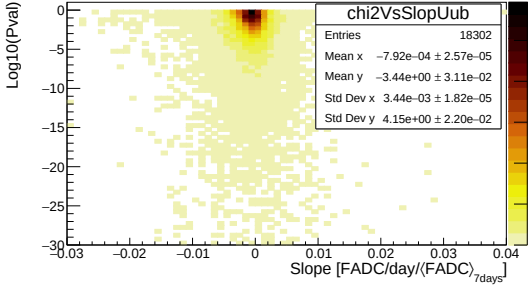
Distribution of Qpk per day



Moving window algorithm results

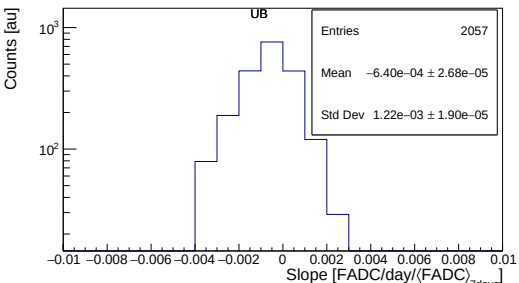
After a cut for > 10 Qpk per day

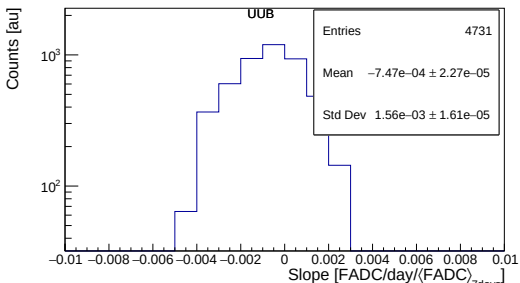




Moving window algorithm results

After a cut for $\chi^2 < 10$, Slope $\mu \pm \sigma$, and Log10(Pval) > -5.0

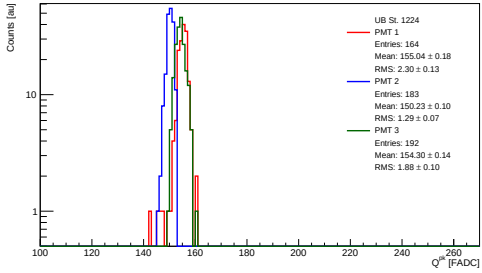


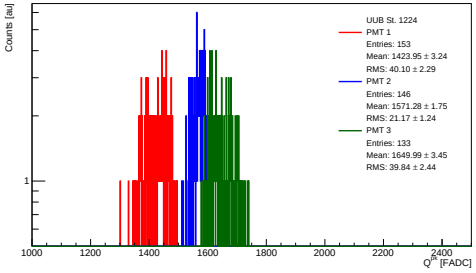


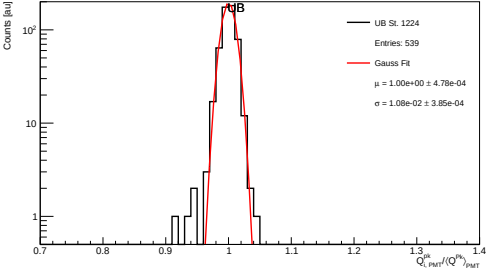
How the accuracy is calculate

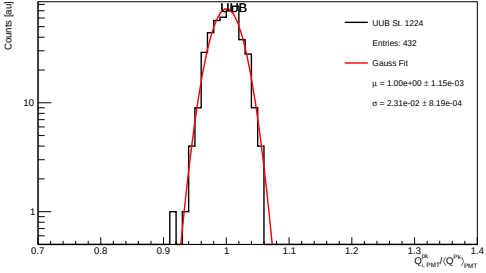
1. After the cuts, per station and per PMT, a set of 7-day-series is obtained.
2. If for the same station, a PMT was not chosen, e.g. in UB version, this one is not taken into the account for UUB, and vice versa.
3. With the chosen PMT, a singular normalized distribution is built for UB and UUB version.
4. A Gaussian function is fitted to the normalized distribution and then the accuracy is calculated as: σ/μ, respectively.

How the accuracy is calculate

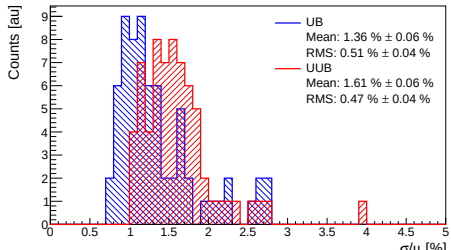


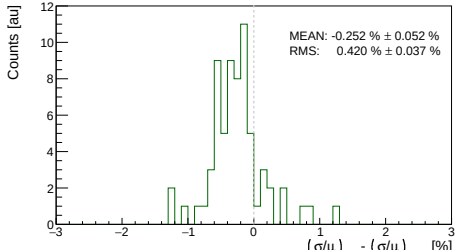


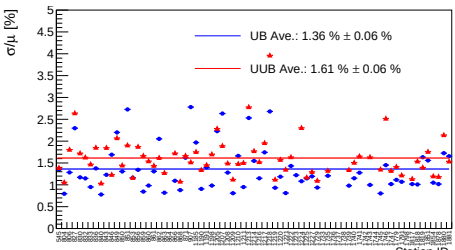


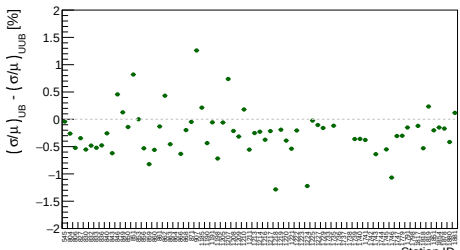


Accuracy results



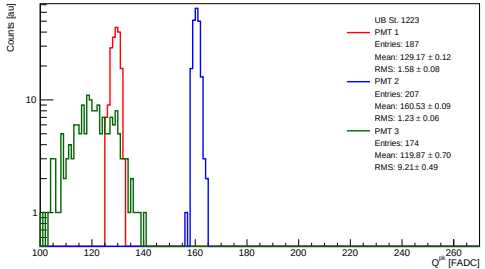


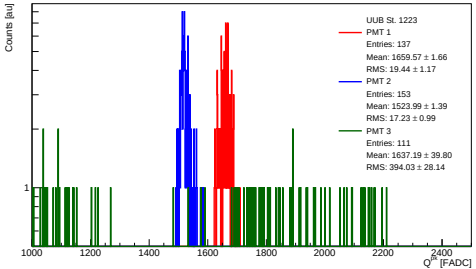


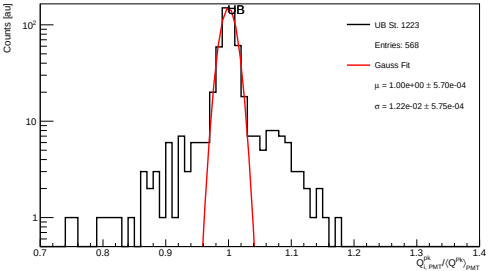


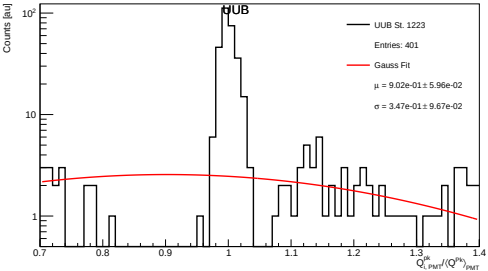
For accuracy distribution, only $\sigma/\mu < 5.0\,\%$ considered.

Outliers, $\mu/\sigma > 10.\,\%$

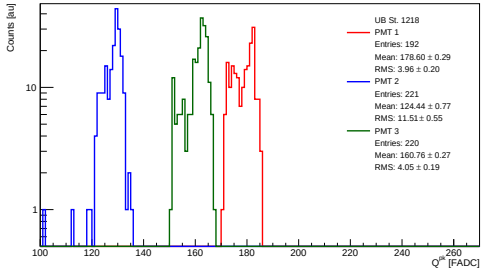


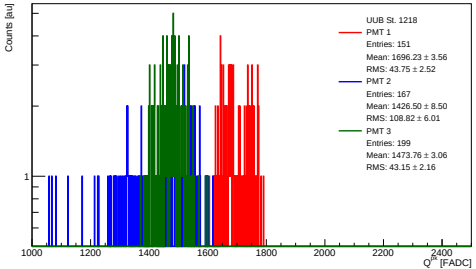


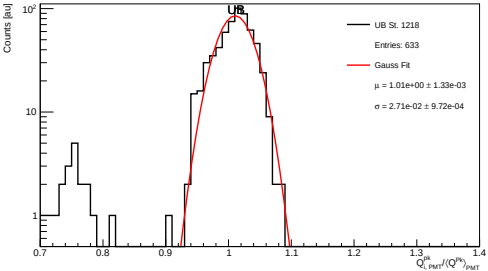


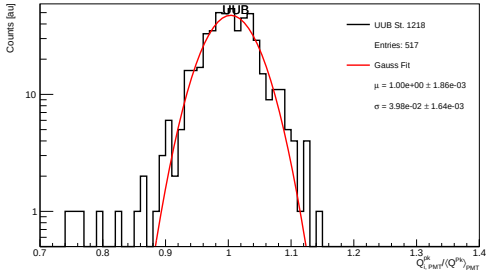


Outliers, $\mu/\sigma > 3.5\,\%$ and $(\mu/\sigma)_{\mathrm{UB}} - (\mu/\sigma)_{\mathrm{UUB}} < -1.\,\%$

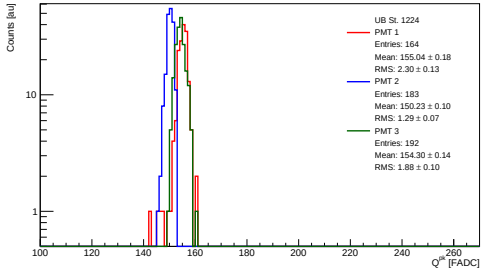


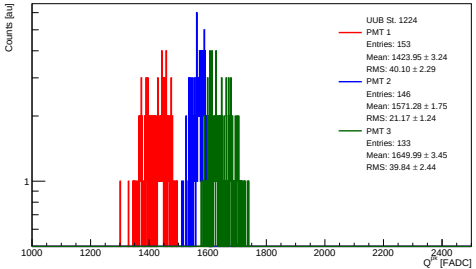


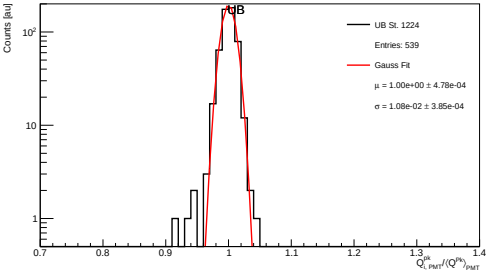


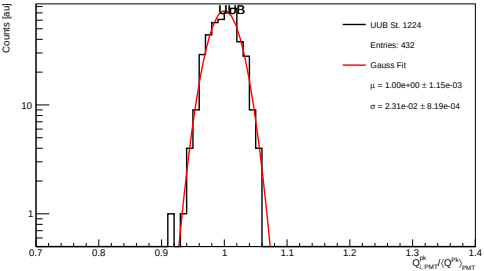


Outliers, $(\mu/\sigma)_{\mathrm{UB}} - (\mu/\sigma)_{\mathrm{UUB}} < -1.\,\%$

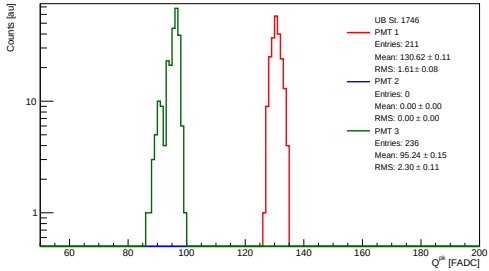


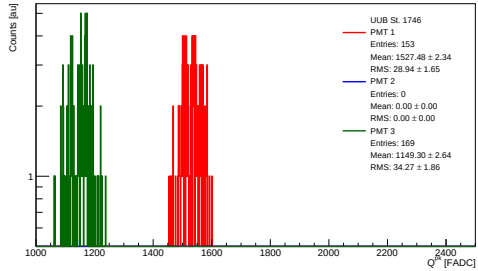


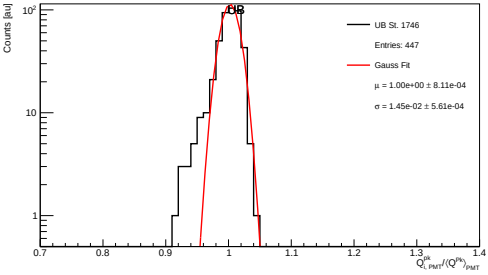


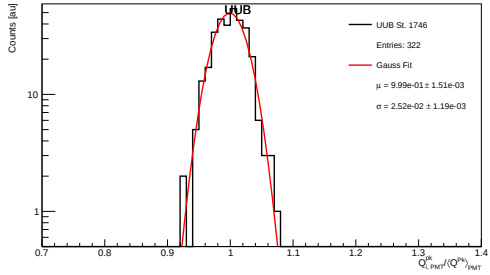


Outliers, $(\mu/\sigma)_{\mathrm{UB}} - (\mu/\sigma)_{\mathrm{UUB}} < -1.\,\%$

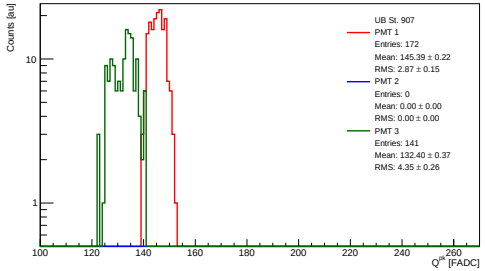


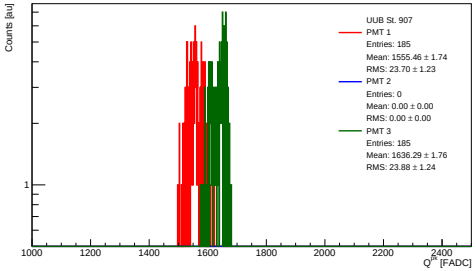


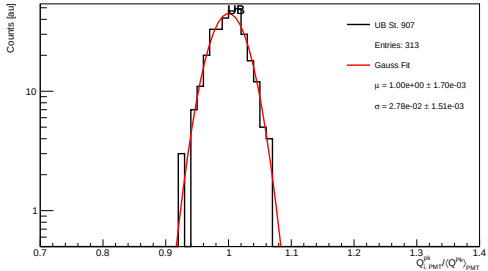


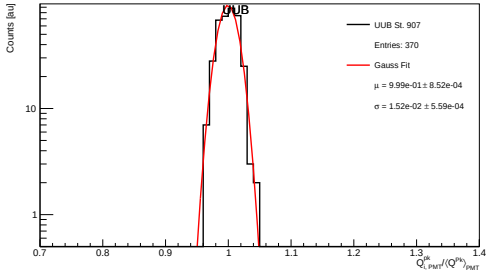


Outliers, $(\mu/\sigma)_{\mathrm{UB}} - (\mu/\sigma)_{\mathrm{UUB}} > 1.\,\%$









Backup

Moving window