Description of the sampling data

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This document contains information on how the sampling data generated in the Paderborn Quantum Sampler for the manuscript "Benchmarking Gaussian and non-Gaussian input states with a hybrid sampling platform" (arXiv:2512.08433) is stored. Experimental details can be found in the article and its Supplementary Information.

1. Switching between Scattershot/Thermal and Gaussian boson sampling (SBS/TBS and GBS) is happening every 20 seconds through an electro-optic modulator (EOM).

2. The target and reconstructed squeezing parameters, corresponding to different measurement runs, are listed in table 1. The squeezing parameter r here is defined such that the quadrature variance would be reduced to e^{-2r}, or in terms of mean photon number $\langle n \rangle = sinh^2(r)$. The measurement data is stored in "*RunX.tar.gz*" with X being the number of the measurement run as listed in table 1.

3. The data is saved in *txt* files with the filenames "*weak_pnr_100000_i.txt*" where i is a number, and 100000 is the number of samples (i.e. integration time of 0.1 s per file for our sampling rate of 1 MHz). i = 1 first 100 ms of the measurement, i = 2 second 100 ms of the measurement, etc.

4. The structure of the data can be seen in table 2.
   The first column is a unique identifier that represents the EOM state, signal and herald patterns as a single number and is mainly used in the data acquisition program, it can be ignored.
   The second column is the heralding pattern, it contains the photon number (n = 0, 1, 2, ...) in each of the 8 heralding modes. The photon-number resolution, i.e. maximum number of photons that could be observed for the heralding modes, is: $[34, 34, 34, 36, 36, 36, 35, 35]$
   The third column is the signal pattern, same as for heralding but for the interferometer output. Here the photon number resolution is up to 3 (n = 0, 1, 2, 3(+)) per mode.
   The fourth column is the EOM state which indicates if the system is in GBS or in SBS/TBS configuration,
   0 = GBS,
   1 = SBS/TBS.
   The fifth column is the number of occurrences for the corresponding signal and heralding pattern combination in the specific EOM state.
   Within the lines the entries/columns are separated by whitespace.
   Note that for analysing GBS and TBS data, the heralding arm (second column) should be ignored. For SBS the heralding arm contains information about the input state to the interferometer.

5. Some *txt* files at the beginning of the measurements, i.e. files with small indices $i = 1, ..., j$ up to a file number j, will be empty since the data acquisition program waits for a first trigger signal to be able to indicate if the pulse picker is in SBS/TBS or GBS state before storing data. How many files are empty is different for each measurement run. Note: The first file that contains data (file $j + 1$) can have less than 100k samples.

6. Some *txt* files around the switching points will be empty and/or contain less than 100k samples (even though the txt filename still has 100000 in the name) to prevent potentially wrong assignment of GBS data to SBS/TBS state and vice versa (which could arise from time jitter and inaccuracies in the timings).

Run	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Target r	0.2	0.3	0.45	0.6	0.75	0.9	1.05	1.2
Recon. r	0.176	0.265	0.403	0.545	0.697	0.843	1.012	1.176

Table 1: Target and reconstructed squeezing parameters r for each measurement run. The reconstructed squeezing parameters are obtained from the measured mean photon numbers $\langle n \rangle_{Herald}$ and Klyshko efficiencies η_{Herald} in the heralding arm while the system is in SBS/TBS configuration. A short explanation and description of Klyshko efficiencies can be found in the articles supplementary information "*Appendix B: Experimental Design; 8. System Characterization; a. Total Transmission*". Details on the reconstruction of the squeezing parameters are given in "*Appendix E: Measurement run overview; 1. Data Acquisition*".

Unique Identifier	**Heralding Pattern**	**Signal Pattern**	**EOM State**	**Occurrences**
0	$[0,0,0,0,0,0,0,0]$	$[0,0,0,0,0,0,0,0,0]$	[0]	91095
32768	$[0,0,0,0,0,0,1,0]$	$[0,0,0,0,0,0,0,0,0]$	[0]	670
65536	$[0,0,0,0,0,0,0,1]$	$[0,0,0,0,0,0,0,0,0]$	[0]	670

Table 2: Example for the first three lines of a *txt* file, taken from "*weak_pnr_100000_170.txt*" for "*Run1.tar.gz*". See point 4 for explanation of the columns. Note that the heading (Unique Identifier, Heralding Pattern, ...) is **not** included in the *txt* files.