Supplementary Information

Macroscopic waves, biological clocks and morphogenesis driven by light in a giant unicellular green alga

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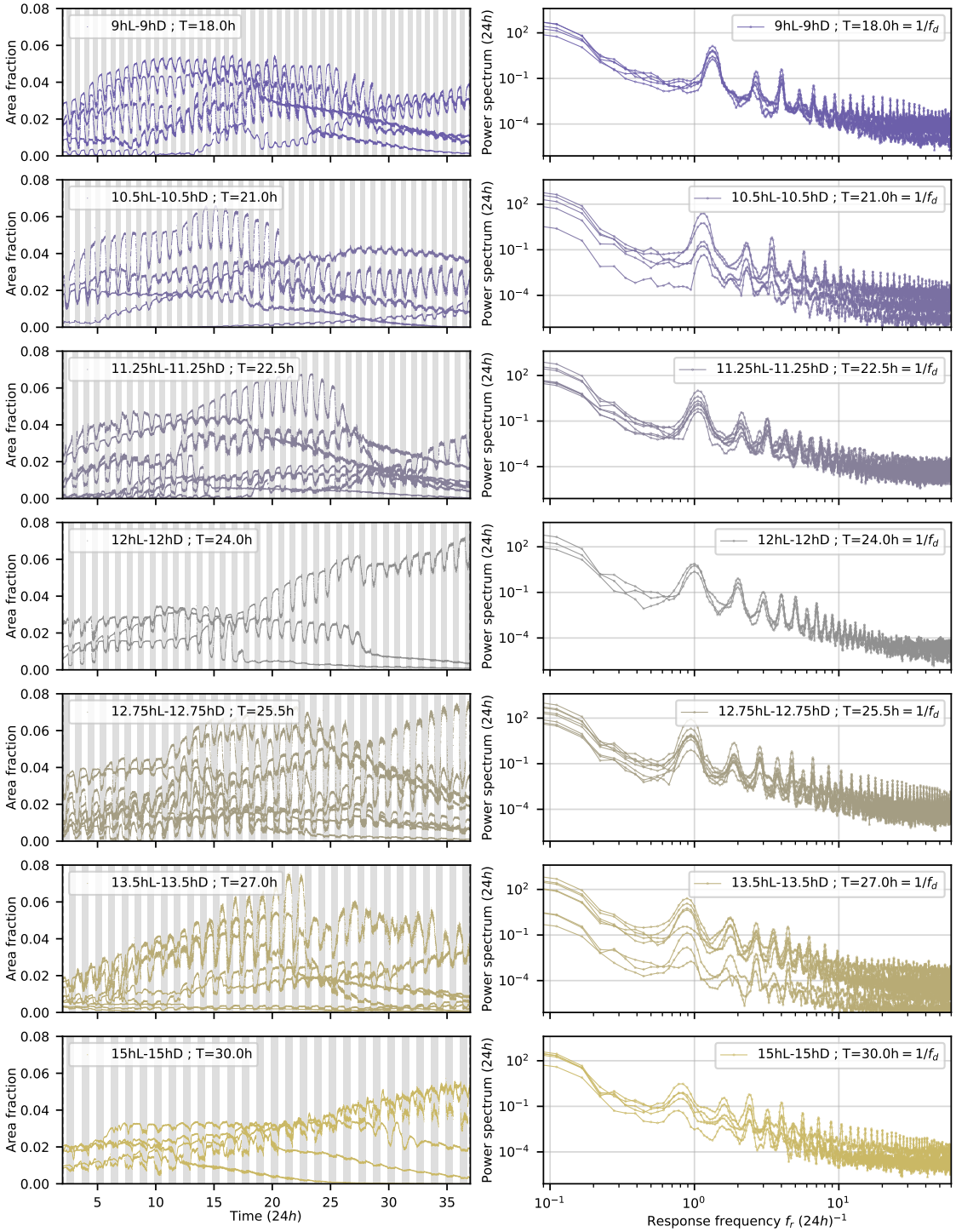
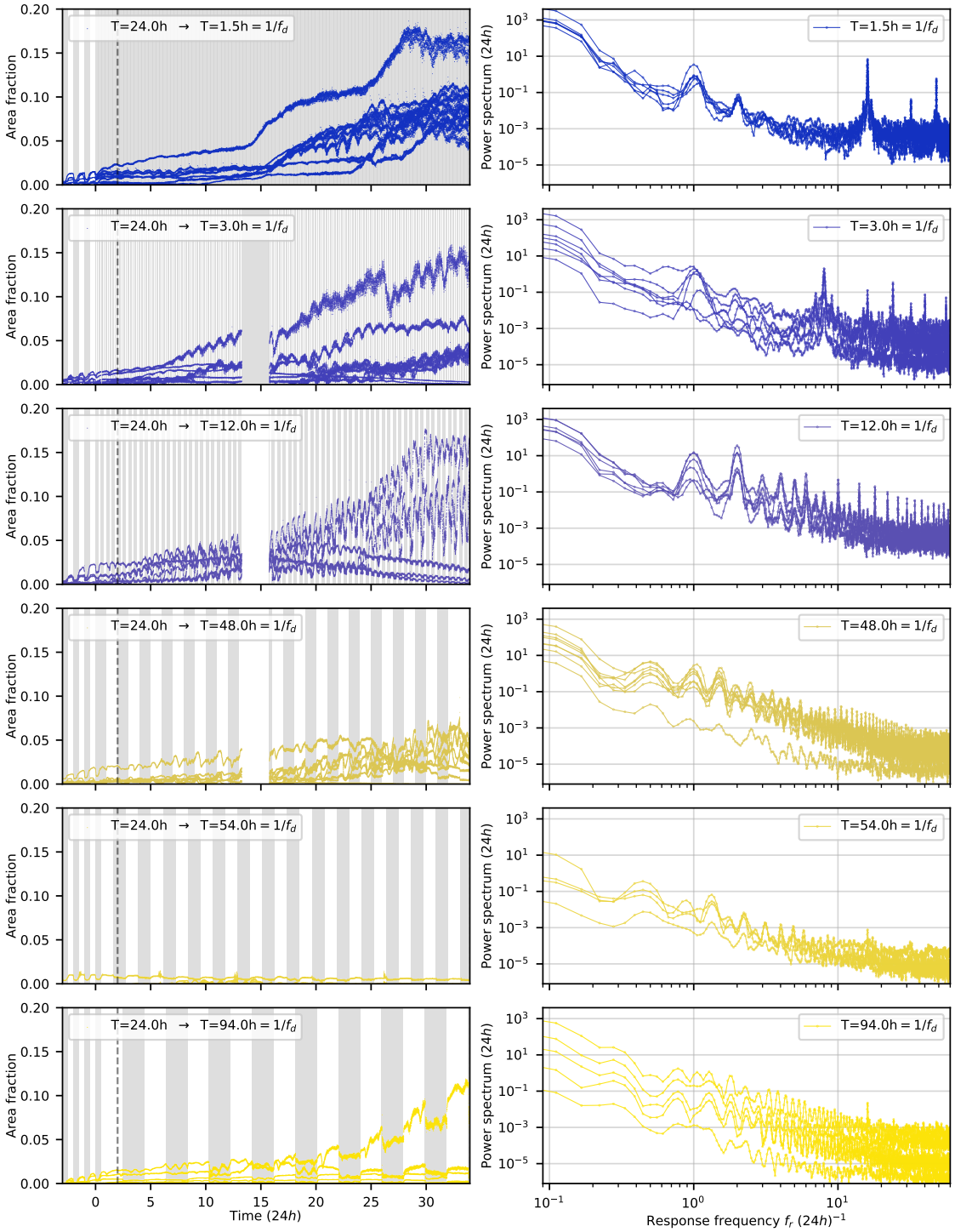
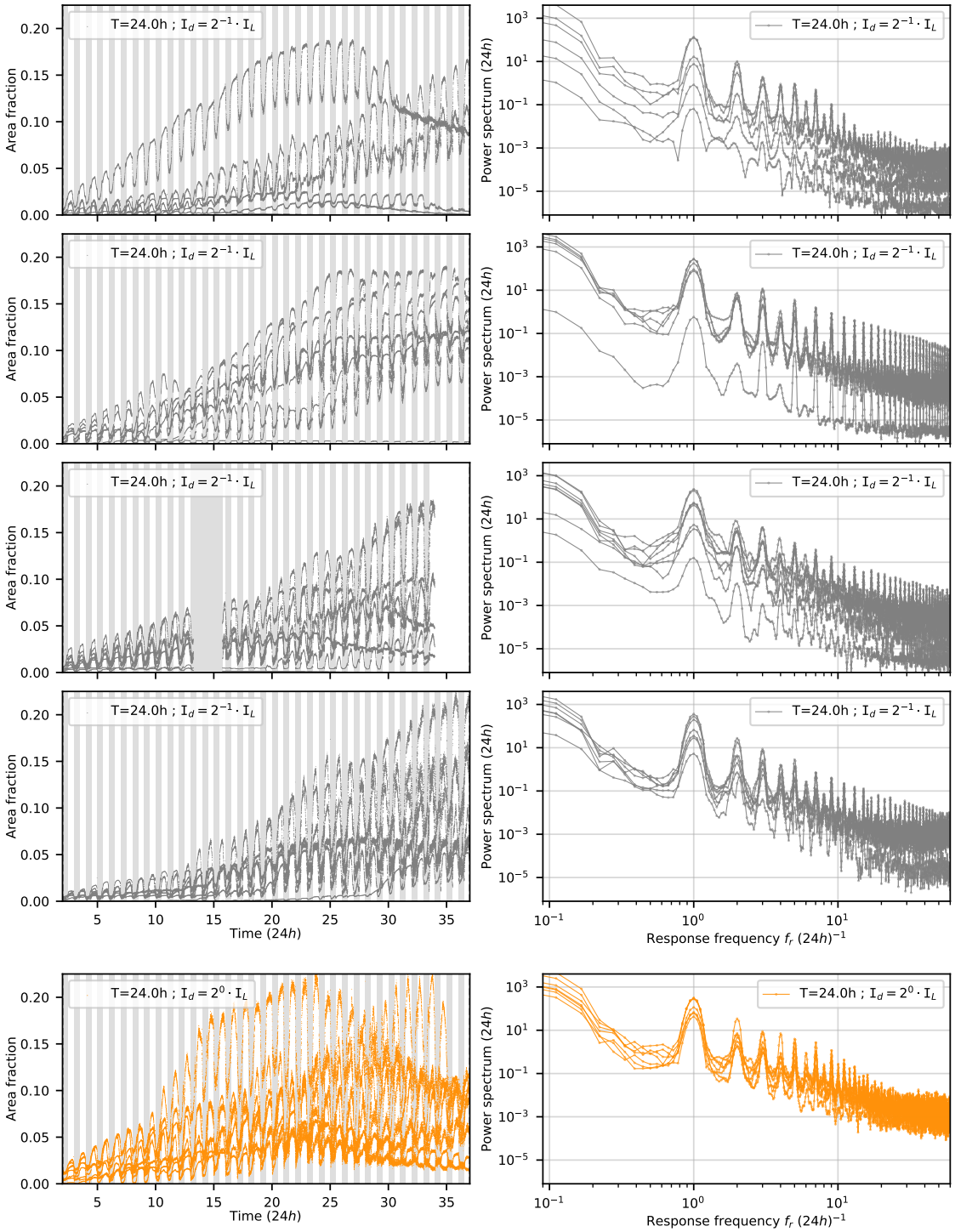


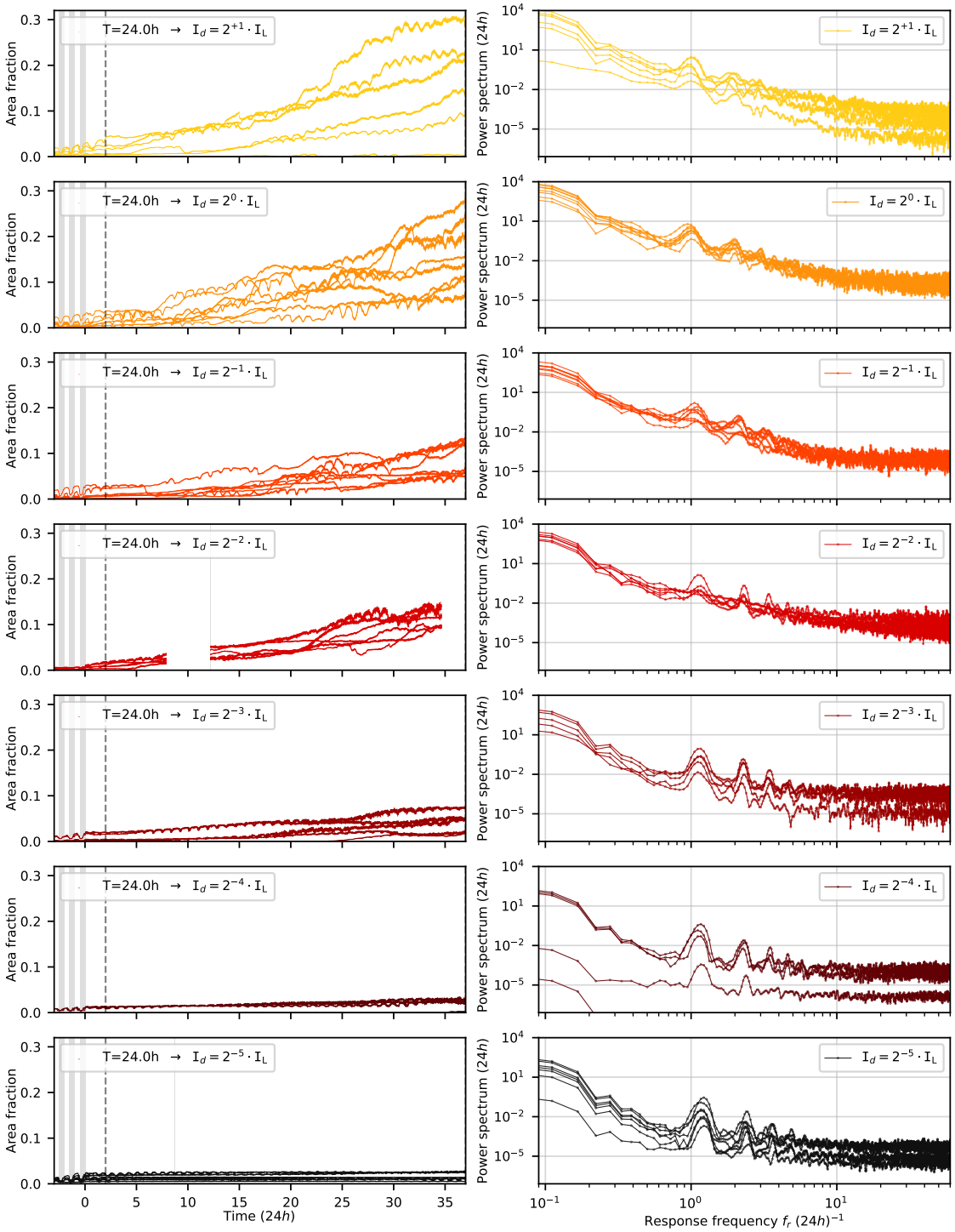
Supplementary Fig. 1: Time series and corresponding power spectra under driving illumination periods within 18h to 30h. Area fraction corresponds to the measured green area within a whole well, normalised by the area of the well. Each curve corresponds to a distinct sample. Response fundamental frequencies $f_{r,0}$ inferred from the power spectra on the right are presented in Fig. 2d. Averages over power spectra curves, grouped by driving illumination frequencies, $f_d = 1/T$, are shown in Fig. 2c. The data in Fig. 2a,b are presented here again for comparison, labeled "12hL-12hD ; T=24.0h".



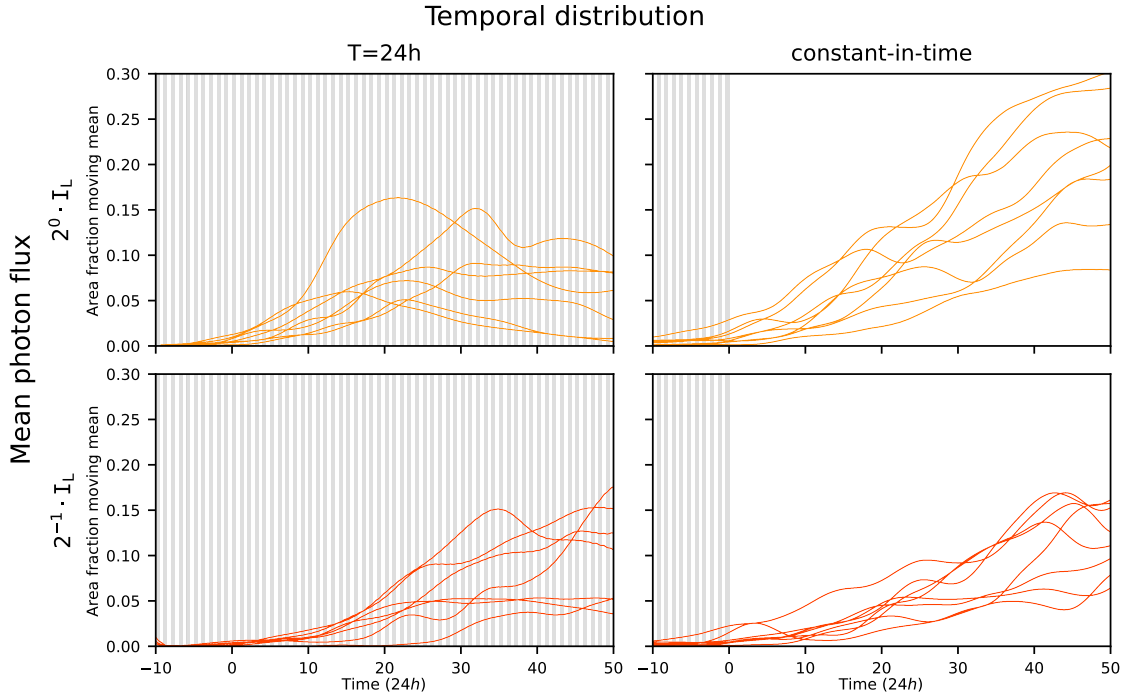
Supplementary Fig. 2: **Time series and corresponding power spectra under driving periods far from 24h.** Averages over the power spectra curves on the right, grouped by driving illumination frequencies $f_d = 1/T$, are presented in Fig. 3c as heatmaps. Examples from the T=3h and T=48h panels on the left are highlighted in Fig. 3a,b. Power spectra are inferred from intervals starting two days after the transition from 12hL-12hD to the new driving illumination protocol, marked by the dashed vertical line on the time series.



Supplementary Fig. 3: **Additional time series and corresponding power spectra under driving period T=24h.** Panels are grouped by culture dish. Averaging over the power spectra curves corresponding to T=24h $\mathtt{I}_d = 2^{-1} \cdot \mathtt{I}_\mathtt{L}$, in grey (top four panels), together with T=24h in Supplementary Fig. 1, results in the heatmap column labeled $f_d = 1/24h$ in Fig. 3c. For comparison, samples subject to T=24h $\mathtt{I}_d = 2^{0} \cdot \mathtt{I}_\mathtt{L}$ are presented in orange (bottom panel).



Supplementary Fig. 4: **Time series and corresponding power spectra under constant illumination intensities within $2^{-5} \cdot \mathtt{I_L}$ to $2^{+1} \cdot \mathtt{I_L}$.** Response fundamental frequencies $f_{r,0}$ inferred from the power spectra on the right are presented in Fig. 4c. Averages over power spectra curves, grouped by driving illumination $\mathtt{I}_d$, are shown in Fig. 4d. Examples from the $\mathtt{I}_d = 2^{-5} \cdot \mathtt{I_L}$ and $\mathtt{I}_d = 2 \cdot \mathtt{I_L}$ panels on the left are highlighted in Fig. 4a,b. Power spectra are inferred from intervals starting two days after the transition from 12hL-12hD to the new driving illumination protocol, marked by the dashed vertical line on the time series.



Supplementary Fig. 5: **Apparent area growth curves comparing mean photon flux levels $2^0 \cdot I_L$ and $2^{-1} \cdot I_L$, at T=24h and constant illumination.** Growth curves inferred from time-series by moving averages. The constant-in-time column shows data presented in Fig. 4e, plotted again here for comparison with T=24h illumination. Snapshots on day 25 of three samples from each of the above panels are presented in Fig. 5.