

Using Dynamic Signal Enhancement (DSE) on Leica Stellaris 8

DSE allows rapid acquisition of satisfactory images from a bright sample. This method is meant for live samples when 100ms – 500ms time resolution is required.

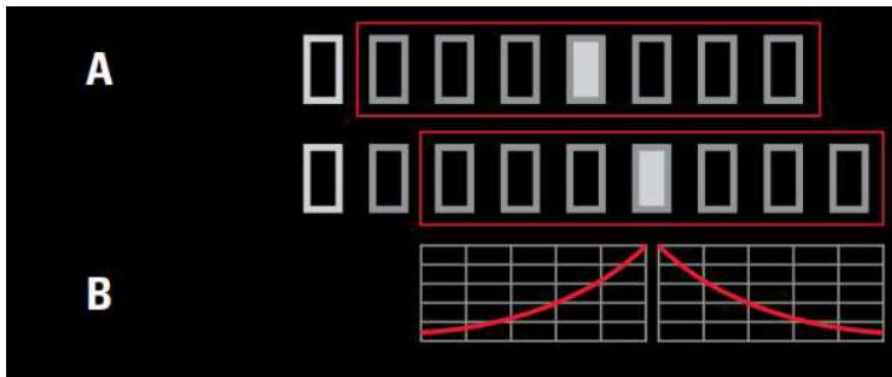
To activate the DSE, you must first ensure that the microscope is in xyzt or xyt scanning mode to allow time series.

This opens the Dynamic Signal Enhancement menu. The 'Frames' tells you how many frames will be averaged to produce the final image. 'Weight' tells you how much the given current time point is weighted in relation to the earlier and later time points



The larger the 'Frames', the better the image quality, but also the larger the 'Frames' the more likely the sample movement will mess with your images.

Frames parameter always has to be an odd number e.g. if you have 'frames' set to 7, the given 'current' timepoint will be an average of the current time point as well as three earlier and three future time points (A). The 'Weight' (B) on the other hand shows how much the 'current' time point is weighted in relation to others. If your sample is moving quickly, you can try having smaller 'Frames' value and larger 'Weight', but this will affect the image quality.



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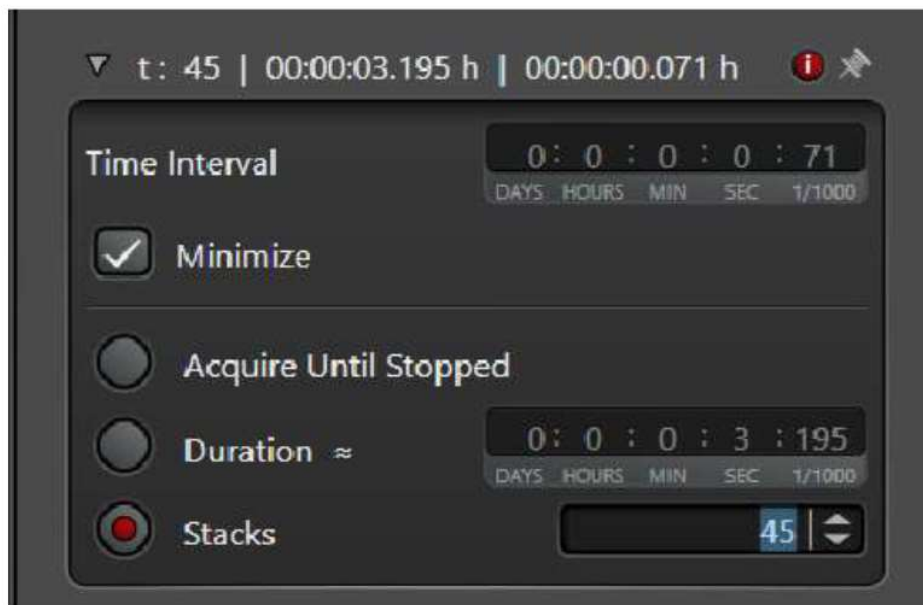
Notably this means that a) the data before the timepoint at $(frames-1)/2$ will be nearly useless and b) that you cannot see the data being collected in true real time as the future time points will affect the current one. You can observe the recording after all time points have been measured.

Next turn on the resonant scanner from the icon that looks like a speedometer. This changes the scan speed to 8000 Hz.



Note that it might be hard to observe the sample with such a high scan speed. So make sure you have located your sample and set up your stack (if any) before turning on the resonant scanner.

Next click 'minimize' on the Time Interval to see the fastest possible acquisition. Your time resolution can be this value or anything above it. However if you plan to take pictures every minute or so, you probably should not use DSE. Use DSE only if you need data 'as quickly as possible'.



Next adjust the number of Stacks so that the amount is at least twice the amount of 'Frames' set earlier and that the duration of the scan fulfils your needs.