The Intensity Response of my Laser is not linear

or

My Laser does not turn on with low Power

Background

In virtually all laser scanning microscopes from other manufacturers, the laser intensity is regulated via an AOTF. The AOTF is calibrated in a way that the intensity of the laser increases linearly with a linear setting in the LSM software. This can create confusion when customers are used to other systems and then work with PQ-hardware. Worst case they think their head is damaged.

Answer

In the SymPhoTime and SEPIA II software, not the laser intensity is regulated, but the current driving the laser. Any diode has a different intensity response. Also, the laser threshold is different in every diode. If the laser driver is operated with a too low intensity, the current is below the laser threshold level and the laser is off. Slightly above the laser threshold, typically the narrowest pulse is obtained. You can check the laser specifications delivered with your system in order to see where the laser threashold of your laser diode is. Typically, slightly above the laser threshold the intensity response is steapest with increasing “intensity” setting and saturates towards 100% intensity. As the pulse shape changes with the settings on the laser driver or the software, we recommend to use optical attenuation to regulate the intensity, for PQ-produced systems either available on the Laser Coupling Unit or - if it's a directly coupled laser - at the attenuation screw in front of the laser.

Additional info

In order to avoid confusion, set the intensity to 100% as a default in the software/on the driver and attenuate only optically. This setting is usually good enough, unless the sample lifetime is extremely short. The intensity response of fiber coupled lasers can be different dependent on whether the seed or the amplification laser is regulated (old/new fiber lasers). The threshold level for heads is different for pulsed and cw mode and can also slightly shift when different repetition rates are used (but only slightly).

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