



**Top 3 advantages of  
BoulderNonLinearSystems SLM's  
compared to competing devices.**

Vinkeveen, maart 2010.

1. Reflectivity – BNS dielectric mirror coating process is of a very high level. Competitors simply coat the silicon chip with a dielectric mirror, which conforms to the aluminum pixel pads as well as the gaps between the pixel pads. The result is a dielectric mirror surface that appears to have regular grooves in it where all of the pixel gaps are located.

This causes diffraction into higher orders, which in turn lowers the effective optical efficiency. This diffraction means that the optical efficiency is only slightly better than our standard SLM.

Our high-efficiency process is to fill these in these inter-pixel gaps, planarize the fill material, then apply the dielectric mirror coating. This results in a true mirror-like surface that has very little diffraction into higher orders and hence much better optical efficiency.

BNS guarantees 90 – 95% optical efficiency, much better than competitors can.

2. Our SLMs have a much higher electrical load rate. Each pixel is basically a capacitor. The liquid crystal bleeds the charge off of these pixel capacitors and if the charge is not refreshed soon enough the voltage of the capacitor will drop, resulting in the optical modulation, or phase value, changing.

BNS refresh the entire SLM at a rate of 6.000 Hz on the 512 x 512 SLMs, or every 165 us. Some competing models only refresh at about 60 Hz, resulting in a lot of what we call flicker, or phase droop. Instead of having a nice stable phase response over time, the response looks like a sawtooth curve with a 60 Hz frequency. Plots of this can be seen in our data sheets. Many of our customers come to us specifically because they have had flicker problems with other devices.

3. Optical Flatness – Our SLMs are guaranteed to be optically flat to 1/3 of a wave, worst-case at 532 nm, much better at longer wavelengths.

Pieter Kramer,  
Laser 2000 Benelux.