

## Cobolt Zouk™ 355 nm: a true CW compact DPSS laser for flow cytometry

While compact solid-state laser alternatives meeting the required specifications for laser induced fluorescence (LIF) experiments are now available at wavelengths covering most of the visible spectrum, there has been a lack of suitable sources in the UV part of the spectrum.

**Lasers in the UV are attractive for excitation of fluorophores** such as Hoechst Blue, DAPI and Indo-1 for use in DNA analysis and calcium imaging applications. A true CW, compact DPSS laser in the 350–360nm region would therefore be an interesting alternative to the currently available UV or near-UV laser sources, especially when considering adding UV excitation capability to bench-top instruments targeting clinical applications.

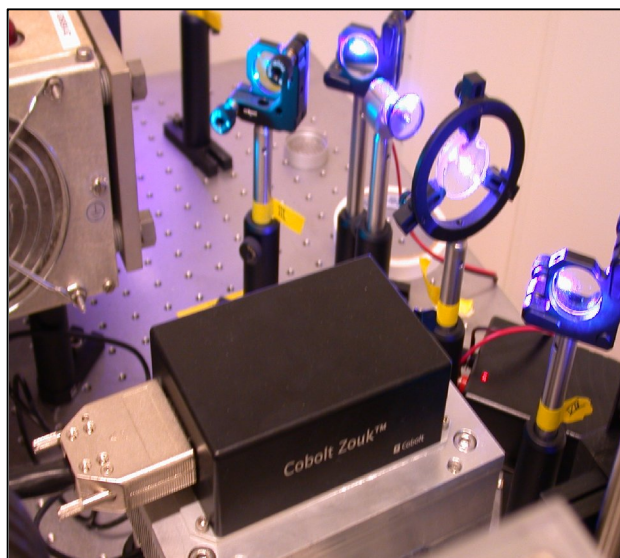


Figure 1. Cobolt Zouk™ 355 nm applied in Calcium research (Courtesy of Dr Anders Tengholm, Medical Cell Biology, Uppsala University Sweden).

### Some applications examples:

**Flow cytometry - DAPI:** The UV sensitive fluorophore DAPI (Molecular Probes) is used to stain dsDNA and RNA in multicolour flow cytometry experiments. The excitation maxima is at 358nm and emission at 461nm. The data in Figure 2 shows excitation of sensitivity calibration microspheres using the Cobolt Zouk™. The wavelength of the Cobolt Zouk™ is ideally matched to the excitation maxima of DAPI making it a preferred source for such experiments and the data shows it is as good as any other 355nm UV light source.

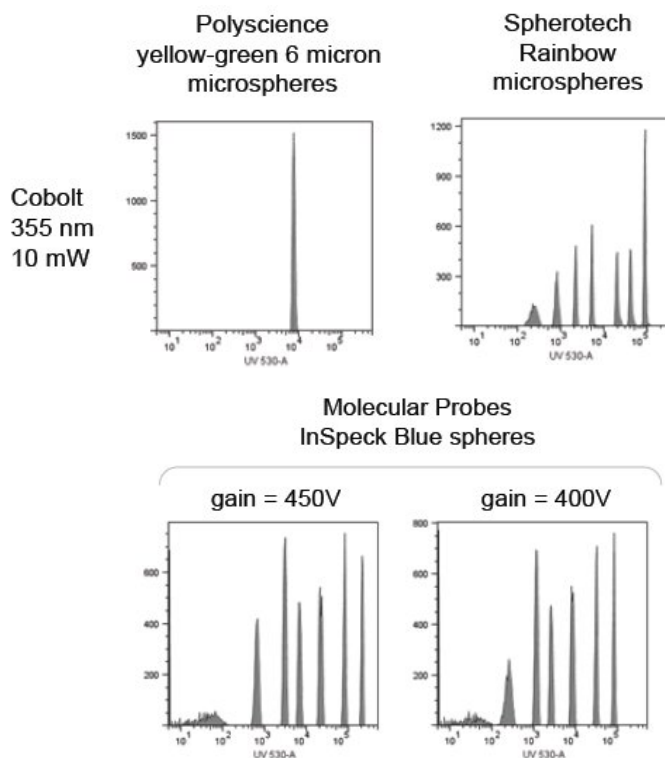


Figure 2. Calibration of flow cytometer using standard DAPI sensitivity microspheres. Data shows the Cobolt Zouk™ is as good as any other 355nm source. (Courtesy of Dr Bill Telford, NIH, USA).

### Stem Cell research – Hoechst 33342:

This fluorophore can also be used to stain DNA to visualize nuclei and mitochondria. It is actively transported out of the cells and thus can be used to sort mixed populations of cells. Hoechst can be therefore used in stem cell research to look at the side population phenotypes. Changes in stem cell activity, indicating possible presence of cancer, can be seen in the side population. Figure 3 shows an example of side population using Hoechst 33342 (Invitrogen) and Cobolt Zouk™ 10mW in mouse bone marrow.

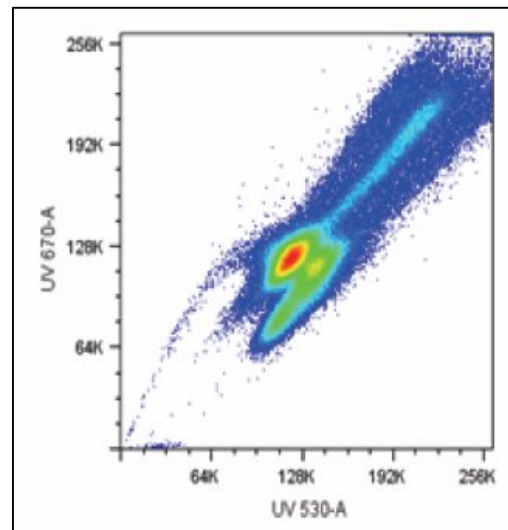


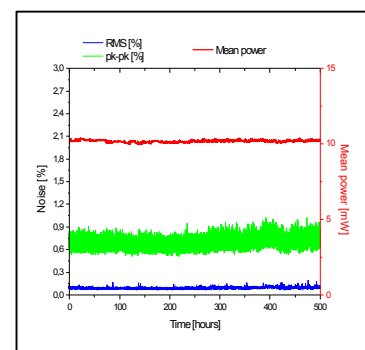
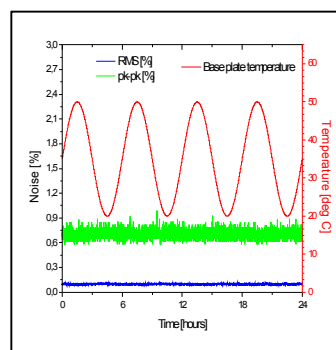
Figure 3. Stem Cell side population in mouse bone marrow (Courtesy of B.Telford NIH, USA).



### Cobolt Zouk™ 355 nm

The Cobolt Zouk™ is a compact single-frequency DPSS laser offering 10 mW CW at precisely 355 nm from a hermetically sealed package, with very low intensity noise, and in a high quality TEM<sub>00</sub>-mode and low-divergent beam.

### Typical noise performance



Typical noise performance of the Cobolt Zouk™ while temperature cycling from 20–50°C shows peak to peak noise <1% and rms noise <0.1%. On the right the power stability is also shown over a period of 500 hrs.