

# In Search of Black Particles in Transparent Plastic Hoses

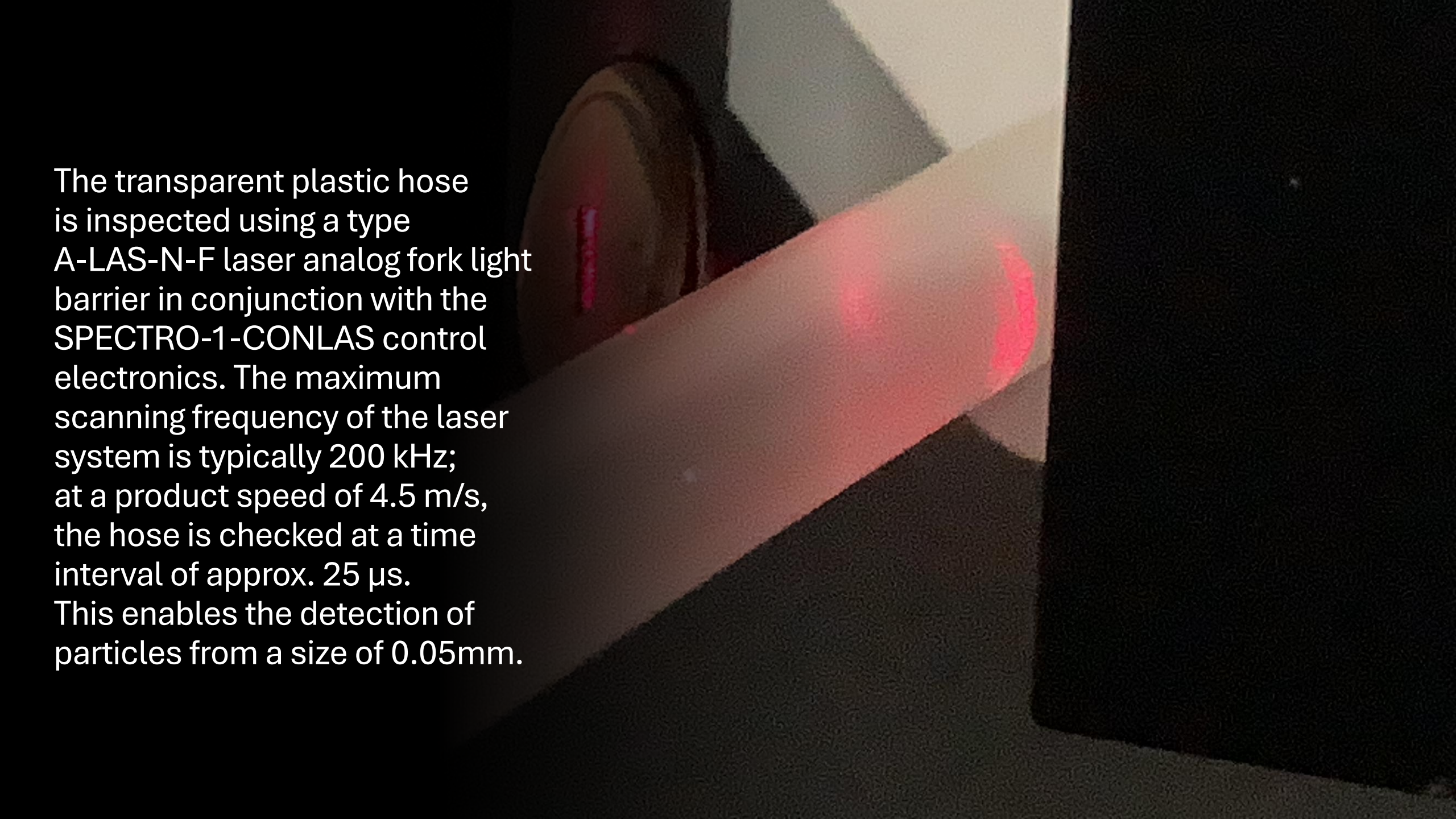
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With the Help of Ultra-fast  
A-LAS Laser Sensor Technology



Black particles from a size of 0.3mm in diameter, which adhere to the inner wall of transparent plastic hoses, must be reliably detected during the hose movement. The hose, with a diameter of 4 mm, moves at a speed of up to 270 m/min.



A close-up photograph of a transparent plastic hose being inspected. A red laser light barrier is visible, scanning across the hose. The background is dark, and the hose is illuminated by the laser light. The text on the left side of the image provides technical details about the inspection process.

The transparent plastic hose is inspected using a type A-LAS-N-F laser analog fork light barrier in conjunction with the SPECTRO-1-CONLAS control electronics. The maximum scanning frequency of the laser system is typically 200 kHz; at a product speed of 4.5 m/s, the hose is checked at a time interval of approx. 25  $\mu$ s. This enables the detection of particles from a size of 0.05mm.

The SPECTRO-1-CONLAS control electronics provides an analog output (0V ... +10V/ 4mA ... 20mA) as well as digital outputs (0V/+24V). The control electronics can be parametrized via the serial interface (USB, RS232, Ethernet, ProfiNet). This can be used, for example, to set the trigger threshold (from which particle size the digital output switches).

TEACH SCOPE

ORDER

TIME [ms] 0.051862

FALLING EDGE

50

2000

1

BREAK SCAN

GRAPH

transparent hose (4mm dia.)

GO

STOP

TIME CALCULATION IS BASED ON THE CYCLE TIME IN THE DISPLAY [ms]

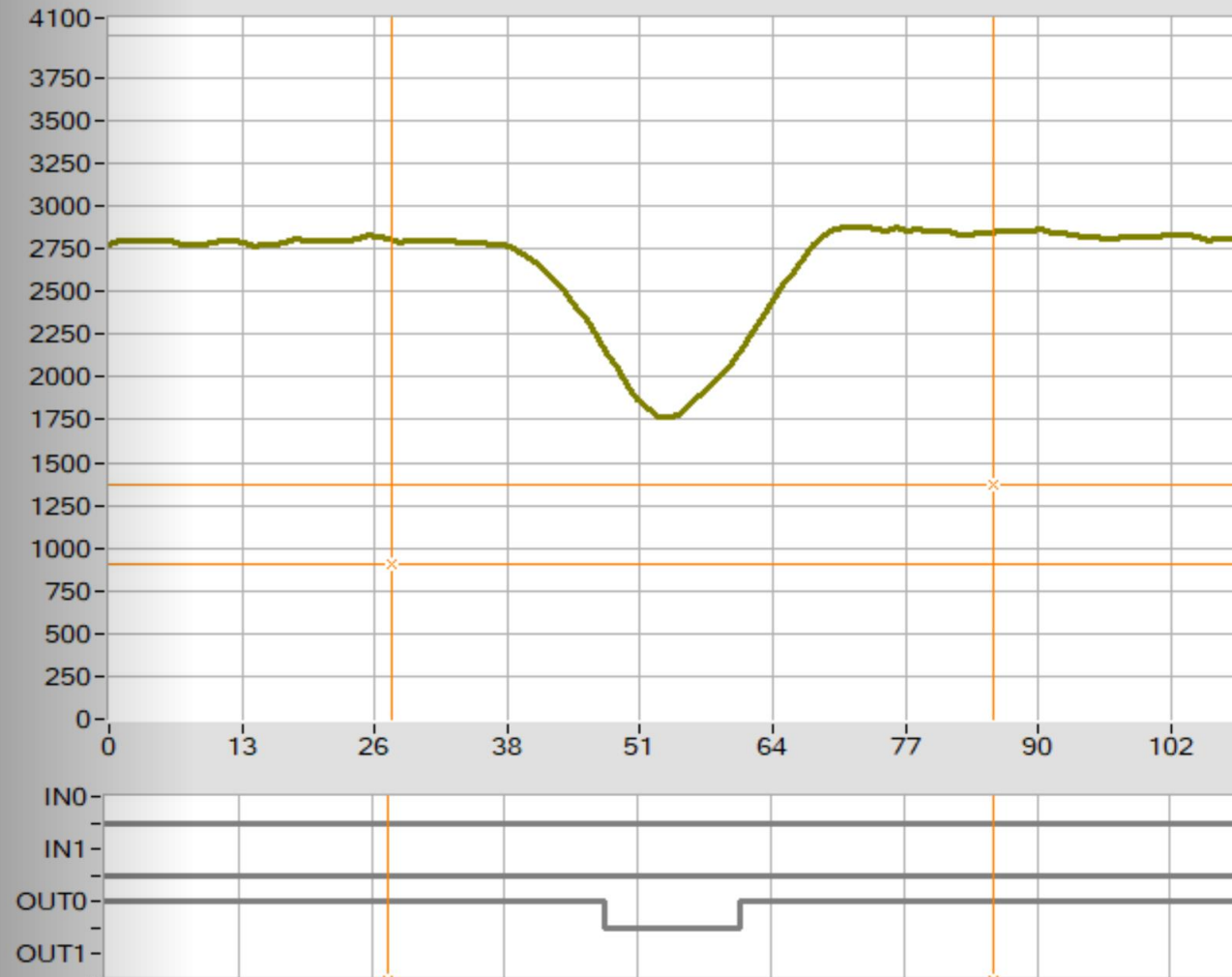
delta X [ms]

3.008

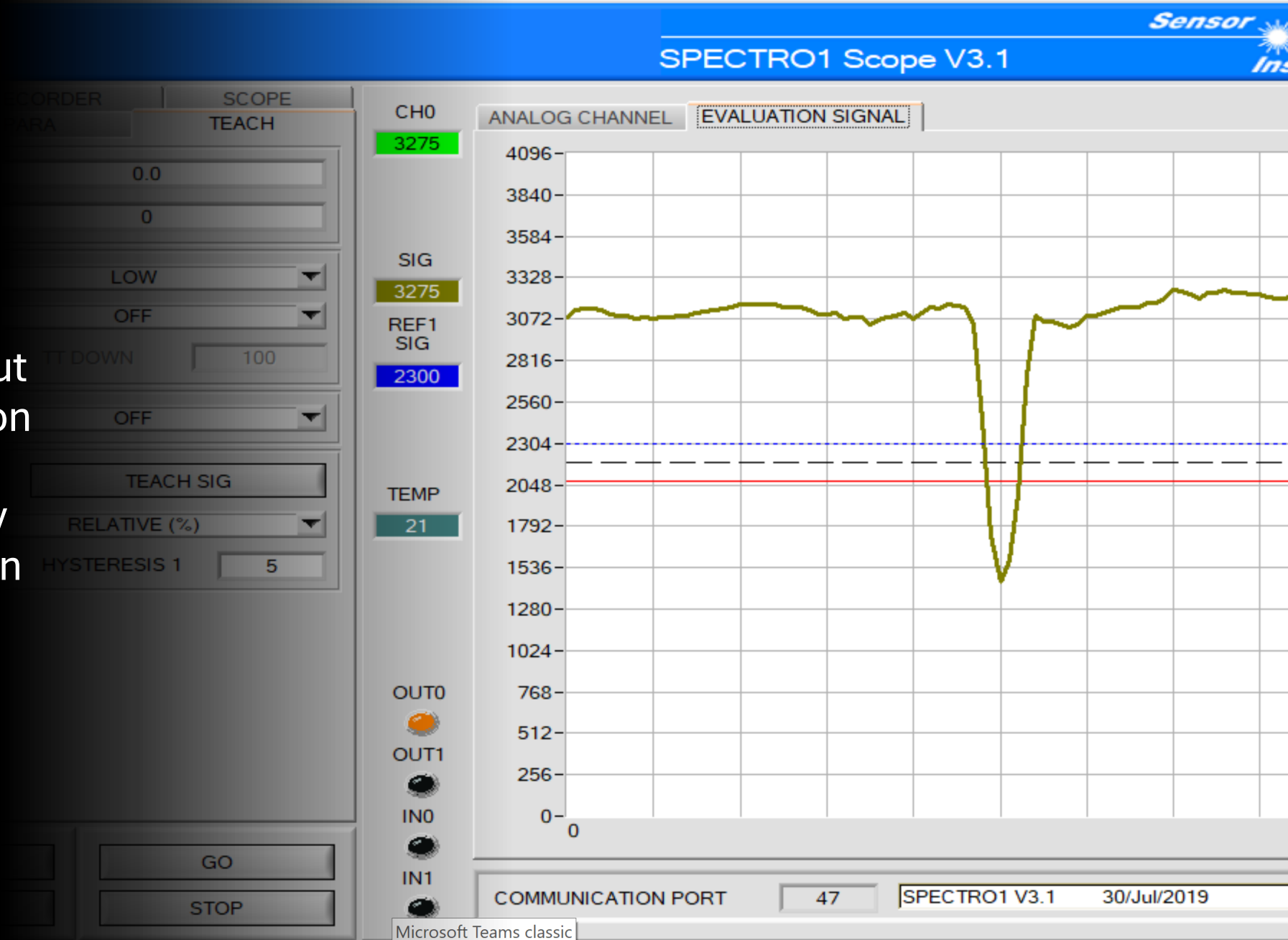
delta Y [digit]

460

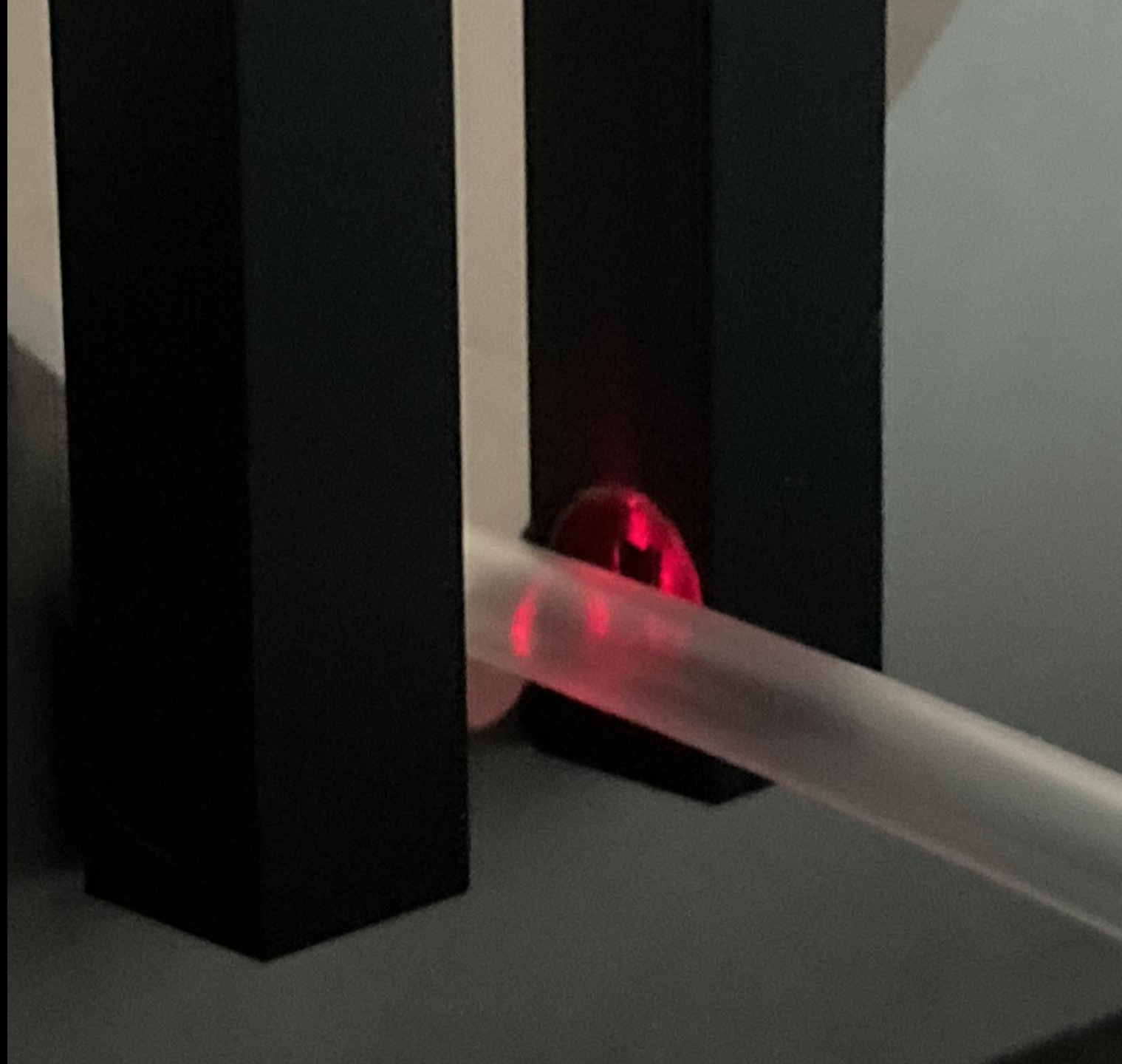
SIGNAL



The Windows software SPECTRO 1 Scope V3.1 also allows the laser output power and the amplification factor to be set. Additionally, the sensitivity with regard to the detection of black particles can be further increased using a differentiator algorithm.



Three laser analog sensors with a laser light curtain of 3mm x 0.5mm each are required to detect the defects over the entire circumference of a 4mm diameter hose. The three laser forks are arranged at an angle of 120° to each other.



# Detection of Black Particles in transparent Plastic Hoses

## Using superfast Lasertechnology

Combined with easy-to-use parametrization software

*Our specialists are happy to tell you more about it*

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