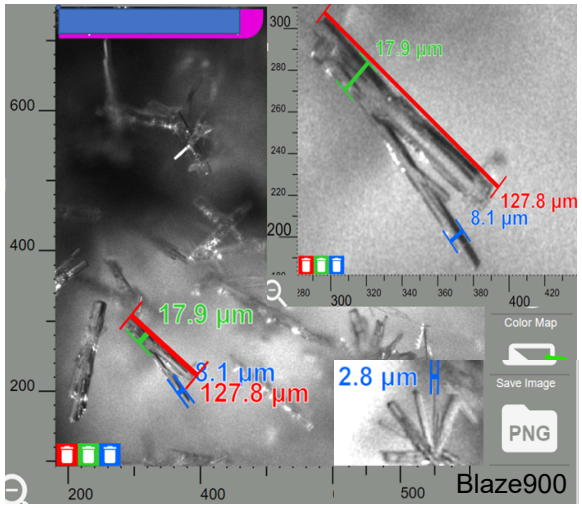
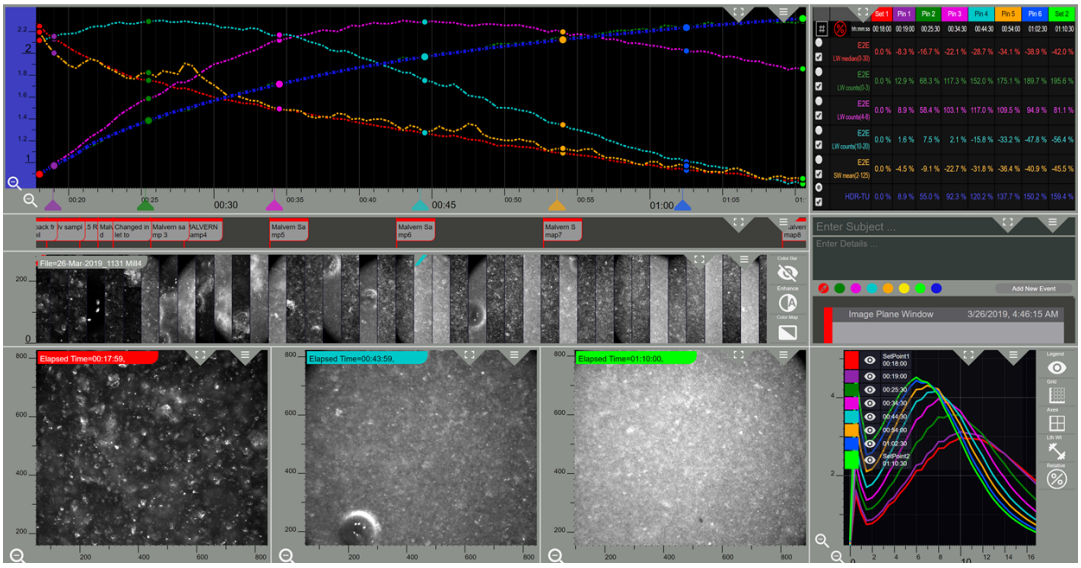
BlazeMetrics | One Probe - Best in Class PAT - Simultaneous Acquisition

- **Enabling Best in Class Microscopy:** Blaze high contrast, high resolution, & highest dynamic range in-process microscopy enables a next level understanding of the particle system at ultra low to the highest dispersed phase concentration & smallest particles sizes.
- **High Dynamic Range Turbidity:** Blaze HDR Turbidity is also pioneering a new dynamic range measuring from ultra low to extremely high dispersed phase concentrations. Track change at nano or micron scale (i.e. milling - micron to nano - at high solids), measure optical transitions in the liquid and/or solid phase, & operate in translucent to black solutions.
- **Advanced CLD:** A-CLD Tracks change in Particle Size, Count, & Shape. Microscopy enables true understanding of the change.
- **PF Raman (optional):** Particle Focused Raman for change in composition with increased dispersed phase signal.



- **OPC Communication** with Reactors & other devices

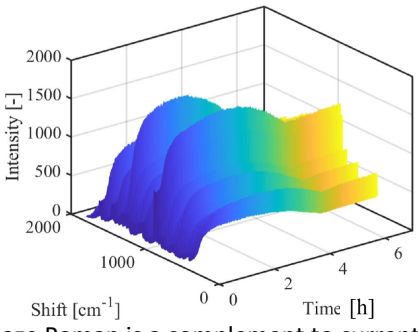


Particle Size, Surface, Shape & Count Analytics

- A-CLD Removes flow speed artifacts & reduces multiple other artifacts of scanning tools. HDR microscopy & turbidity in the same probe enable proper understanding of change in A-CLD, providing a method you can reliably use to track change in Particle Size, Count, & Shape. In addition, Blaze CLD enhances resolution to change on the fine and coarse end of the distribution.
- Blaze broad dynamic range extends standard CLD, turbidity & microscopy capability which enables new process insights & leads to better understanding speeding process development.

Particle Focused Raman Spectroscopy: Enhanced dispersed phase signal & linearizion enables improved identification of Polymorphs, Solvates & Hydrates (785nm or 532nm excitation)

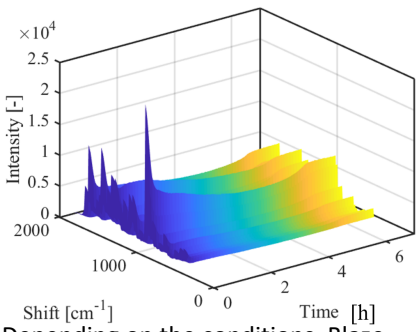
Blaze probe with Kaiser System



vs

Same Process, Same Polymorph Transition, Same Kaiser Spectrometer

Kaiser probe with Kaiser System



Blaze Raman is a complement to current Raman Systems. Depending on the conditions, Blaze can dramatically increase the relative Raman signal captured from dispersed phase particles. This enables users to track polymorphs, solvates, hydrates, particulate impurities as well as differentiate multiple component systems to an enabling degree.

Integrated Analytics & Microscopy

- **OneProbe**: saves time, reduces impact on mixing & thermodynamics, & increased multiple PAT utilization.
- **Microscopy**: eliminates the guess work around CLD, HDR Turbidity, & Raman improving decision making.
- **High Resolution Microscopy**: a new level of PAT Microscopy enables new insights into process dynamics leading to faster process development & more robust processes.

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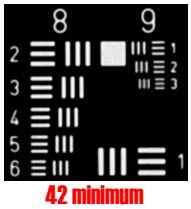
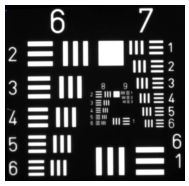
Blaze400

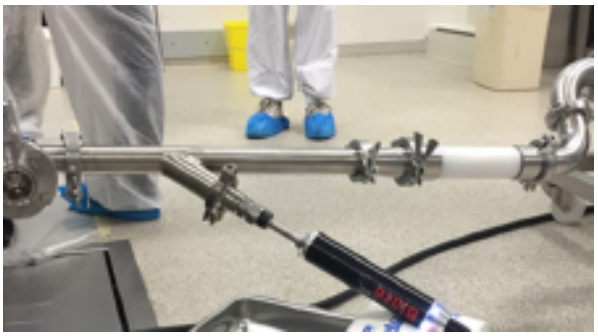


14 bit Microscopy	
Images/second	42 minimum
Field of View	400µm dia.
Depth of Field	≈ 5µm/45µm
Optical Resolution:	<0.74µm
Pixel size	≈ 0.2µm x 0.2µm
pixels per micron	> 5
Particle Detection	< 0.400µm
Stop Motion Laser Pulse	<20ns
532nm Illumination, Class 1M laser rating	
Laser Lifetime typical 25,000 hours	

Blaze900

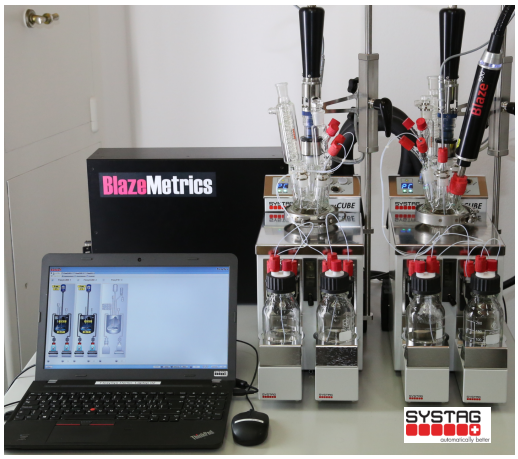


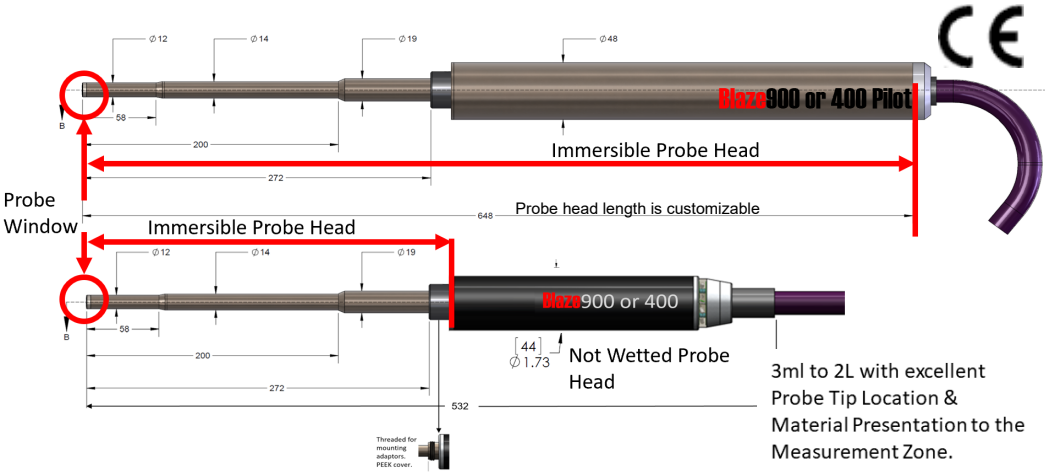
14 bit Microscopy	
Images/second	42 minimum
Field of View	900µm dia.
Depth of Field	≈ 45µm/135µm
Optical Resolution:	< 1.25µm
Pixel size	≈ 0.465µm x 0.465µm
pixels per micron	> 2.15
Particle Detection	< 1µm
Stop Motion Laser Pulse	< 20ns
532nm Illumination, Class 1M laser rating	
Laser Lifetime typical 25,000 hours	



No measurement change with changing flow rates to 20m/sec (change in material presentation excluded)

- **Immersed Probe Tip Operational Temperature Range:** -10 to 100°C
- **Immersed Probe Tip Non-Operational Temperature Range:** -10 to 131°C
- **Pressure Limit (4x Safety Factor at 100°C):** 6 bar
- **Immersed Probe Tip Material:** Hastelloy 22, 276, SS or custom
- **Window Materials:** Sapphire, Kalrez, Nickel, & Gold plate
  (Dry and Liquid systems require different windows)
- **Conduit Length:** Lab: 2.6m or 4.6m; Pilot 4.2m & Custom
- **Optional N2 purge to remove condensation** Flow of 0.5 l/m with 2 bar [29 psi] maximum (clean, dry nitrogen only)
- **Optional Instrument Air Cooling if required in 44mm sec.** Cooling for 44mm section if in heated zone; required >35deg C





- **CE** Certificate of Conformity: Laser Class 1M per IEC 60825. Blaze Systems are Class 1M Laser devices unless optional Raman is integrated. Raman integrated rating is that of the Raman device, typically Class 3B. Blaze is not rated for explosive locations at this time. ATEX project underway.