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Inprentus Expands into New Markets with Breakthrough in Diffractive Optics for Laser and Spectroscopy Applications

R&D advancements in optical efficiency, resolving power, and ruling specifications for blazed diffraction grating products from Inprentus open up new opportunities in the spectrometry and laser OEM markets.

Champaign, Illinois, USA, March 11th, 2019: Increasing optical efficiency in X-ray, ultraviolet and visible light spectrometry applications is a long-standing goal within the laser, spectroscopy and synchrotron light source markets. Over the last two years, Inprentus has made significant advancements towards providing improved diffraction grating specifications for greater optical efficiency, new in-beam diagnostic features, and higher resolving power than have previously been commercially available. These improvements, which are unattainable using standard diffraction grating ruling techniques, were developed to support Inprentus' synchrotron and free electron laser customers over the past several years. These improved specifications are now being designed into commercial applications in the high-power laser market for a variety of applications in manufacturing, scientific research, and surface patterning, and will utilize metallic and dielectric coatings for the reduction of laser induced damage thresholds (LIDT). These improved blazed gratings also offer high optical efficiency, in combination with a broad wavelength range, for use within subsystems of atomic spectroscopy instruments and analytical systems. These new grating designs are making it possible to improve the efficiency and sensitivity of spectrographic instruments while offering the potential to reduce the number of optical elements within the optical sub-system of these instruments, thus reducing their cost and complexity.

These new nanomanufacturing capabilities have broadened the range of several critical grating specifications, enabling industries to take advantage of these improvements. Inprentus can now consistently achieve resolving power specifications over 500,000, which is valuable for synchrotron and other laser applications. A broadened range for blaze angle patterning from 0.1 degrees to over 75 degrees creates advancements in diffraction gratings for both ultra-low blaze angle, in-beam diagnostics, and high blaze angle echelle gratings for spectroscopy applications. The ultra-low blaze angle specifications, previously unattainable with standard mechanical ruling methods, were developed through a series of innovations in tooling design and ruling techniques led by Inprentus senior research engineer and R&D scientist, Dr. Subhalakshmi Kumar. Her application of materials science, in combination with unique multiscale nanoburnishing and process control solutions, has provided improved and consistent diffraction grating ruling specifications not seen before. These innovations enable highly efficient in-beam diagnostic capabilities for free electron lasers. (for details see Inprentus press releases entitled: *Inprentus Awarded $248,000 Contract to Provide the US Department of Energy's SLAC National Accelerator Laboratory with Ultra-high Precision*

Diffraction Gratings and *Inprentus Awarded Contract for Over $200,000 to Provide the European X-ray Free Electron Laser with High-efficiency Diffraction Gratings*).

"For many years there has been a lack of improvement in blazed diffraction grating specifications, and the current limited availability of custom master gratings has slowed development of many spectrometry and laser optics applications. Now, with the improved range of specifications from Inprentus, we are seeing an eager market looking to make an impact on a wider and wider list of applications using our diffraction gratings," said Ron van Os, CEO of Inprentus.

Inprentus Inc.

Inprentus designs, manufactures and sells x-ray and EUV diffraction gratings for a wide variety of diffractive optic applications. Inprentus' gratings are used for scientific and commercial applications by many Fortune 500 companies, academic institutions, and government laboratories around the world. The company was founded in 2012 to commercialize an innovative, nano-scale scribing technology. This technology is a general purpose approach to high-precision patterning of surfaces, in which features must be shaped with 0.1 degree angular precision and positioned with nanometer precision over distances of tens of centimeters.

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