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Micro Laser Assisted Machining of Infrared Materials JAYESH NAVARE, DI KANG, CHARAN BODLAPATI, DMYTRO ZAYTSEV, DEEPAK RAVINDRA, HOSSEIN SHAHINIAN, Micro-LAM, MICRO-LAM, INC. TEAM — This abstract, highlights the Micro Laser assisted machining (μ -LAM) technology in production of optical elements made from Infrared (IR) crystals. In short, the μ -LAM process is an add-on to conventional ultra-precision machining (UPM) centers, that enhances the capabilities of such machines in 2 main ways;(1) reduction of tool wear during machining and (2) enabling the fabrication of optical surfaces on very hard to machine materials. UPM's have been widely used for the past three decades in the optics manufacturing industry. The machines are very rigid and well controlled (<10 nm positional repeatability), and combined with using single crystal diamond tools, they are capable of producing very smooth surfaces (roughness values < 5 nm RMS) on soft metals such as brass and copper. Yet, the application of UPM's is greatly limited when the work-piece material is no longer soft and ductile. The μ -LAM technology uses the emission of a laser beam through the single crystal diamond tool, delivered precisely at the cutting edge. The absorbed laser power, causes a thermal "softening" of the work-piece material, thus promoting a more ductile regime of material removal. This effect, provides the opportunity to machine much harder materials using UPM's.

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