

High precision manufacturing of small aperture double aspheric shaping element

SHIYU CHEN^{1,2,3}, YANG OU^{1,2,3,4}, CHENG HUANG^{1,2,3,4}, WENWEN LU^{1,2,3}, YUPENG XIONG^{1,2,3,4*}

¹College of Intelligent Science, National University of Defense Technology, Changsha 410073, China
²Laboratory of Science and Technology on Integrated Logistics Support, National University of Defense Technology, Changsha 410073, China

³Hu'nan Key Laboratory of Ultra-precision Machining Technology, Changsha 410073, China

⁴Nanhu Laser Laboratory, National University of Defense Technology, Changsha 410073, China
Corresponding Author / Email: yulinlang521@163.com, TEL: +86-15874141146.

KEYWORDS: Small aperture aspheric surface, Ultrasonic vibration assisted cutting, Beam shaping

Small-aperture aspherical optical components that significantly enhance imaging quality and improve the optical performance of instruments when employed in optical systems, The manufacturing of small-aperture aspherical optics still faces issues related to processing efficiency and accuracy, due to the relatively limited processing space for such components. In order to produce high precision small aperture aspherical optical components, The ultrasonic vibration assisted cutting and the high precision grinding and polishing technology were used for the processing. The surface accuracy was less than 200nm measured with a profiler, and the roughness was smaller than 20nm with the help of the white light interferometer.
