# Stitching capabilities at the LCLS Metrology Laboratory

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The limit-pushing requirements for LCLS II to achieve the next level of performance in free electron laser demands almost defect-free (in atomic scale) and long (up to ca. 1 m) optical components. Therefore it is imperative in ensuring all optical components are compliant to specifications, optically and mechanically. Currently commercially available metrology techniques are insufficient for characterizing these kinds of optics. This drives the research and development of innovative metrology methods to meet the challenge.

A promising method for measuring long optics is stitching. We report a fully automated stitching method with a Zygo Dynafiz (a Fizeau interferometer) for measuring the 2D surface profile of 1-m long mirrors and for characterizing the mirror bending mechanics. We will discuss the data acquisition and analysis processes and present the results of a stitched mirror. The advantage and limitation of stitching method will be discussed and compared to other methods.