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***In-situ* long trace profiler for measurement of mirror profiles at third-generation synchrotron facilities**

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X-ray mirrors have the potential to be subjected to extremely high heat loads at third generation synchrotron radiation sources. In many cases, sophisticated cooling methods will be required to prevent surface distortion that would otherwise degrade the intrinsic source brightness. As a diagnostic for such mirrors, we have previously proposed to modify the long trace optical profiler for use within a UHV mirror chamber [1], thereby making it feasible to take profile measurements of mirrors irradiated with high power x-ray beams. We present in detail the mechanical design of a complete *in-situ* measurement.

The objective of developing an *in-situ* measurement system is to aid the development of reliable, low-cost, high-heat-load substrates for mirrors and multilayers. This will provide a firm basis on which to design new optical elements that will be necessary as a result of performance enhancements to current machines, as well as future generations of storage rings.

[1] Shinan Qian, Werner Jark, Peter Z. Takacs, Kevin J. Randall and Wenbing Yun. *Optical Engineering* 34 396 (1995).

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