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**Angle-resolving photoelectron energy analyzer: Mode calculations, ray-tracing analysis and performance evaluation**H. A. Stevens<sup>1</sup>, A. W. Donoho, A. M. Turner and J. L. Erskine

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**Abstract**

This paper describes comprehensive input-lens analysis, ray-tracing studies, empirical mode tests and performance evaluation for a Kuyatt—Simpson-type photoelectron energy analyzer. The analyzer has been designed specifically for angle-resolved photoemission studies using synchrotron radiation. Several operating modes are established using a computer code which combines matrix-optics techniques with ray tracing and least-squares analysis. The code is used to calculate the optimum input-lens voltages required to achieve a prescribed resolution at constant transmission. The modes are also established empirically and are characterized by computer ray-tracing. Performance tests conducted using synchrotron radiation demonstrate that the analyzer is capable of obtaining high-resolution (50 meV) angle- resolved ( $\pm 1.5^\circ$ ) photoelectron spectra at good counting rates ( $\sim 10$  kHz) without multichannel detection.

**Article Outline**

- References

<sup>1</sup> Submitted in partial fulfillment of requirements for the degree of Master of Arts in Physics, University of Texas.

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