

Methods of optimizing X-ray optical prescriptions for wide-field Applications

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We are working on the development of a method for optimizing wide-field x-ray telescope mirror prescriptions, including polynomial coefficients, mirror shell relative displacements, and (assuming 4 focal plane detectors) detector placement and tilt that does not require a search through the multi-dimensional parameter space. Under the assumption that the parameters are small enough that second order expansions are valid, we show that the performance at the detector surface can be expressed as a quadratic function of the parameters with numerical coefficients derived from a ray trace through the underlying Wolter I optic. The best values for the parameters are found by solving the linear system of equations created by setting derivatives of this function with respect to each parameter to zero. We describe the present status of this development effort.