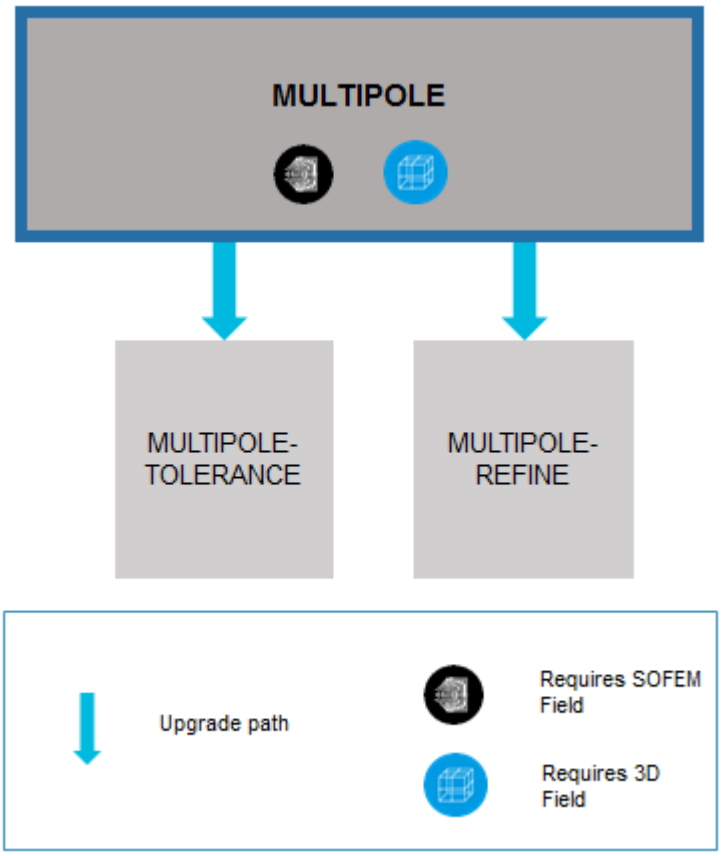
MULTIPOLE

Multipole column design



Overview

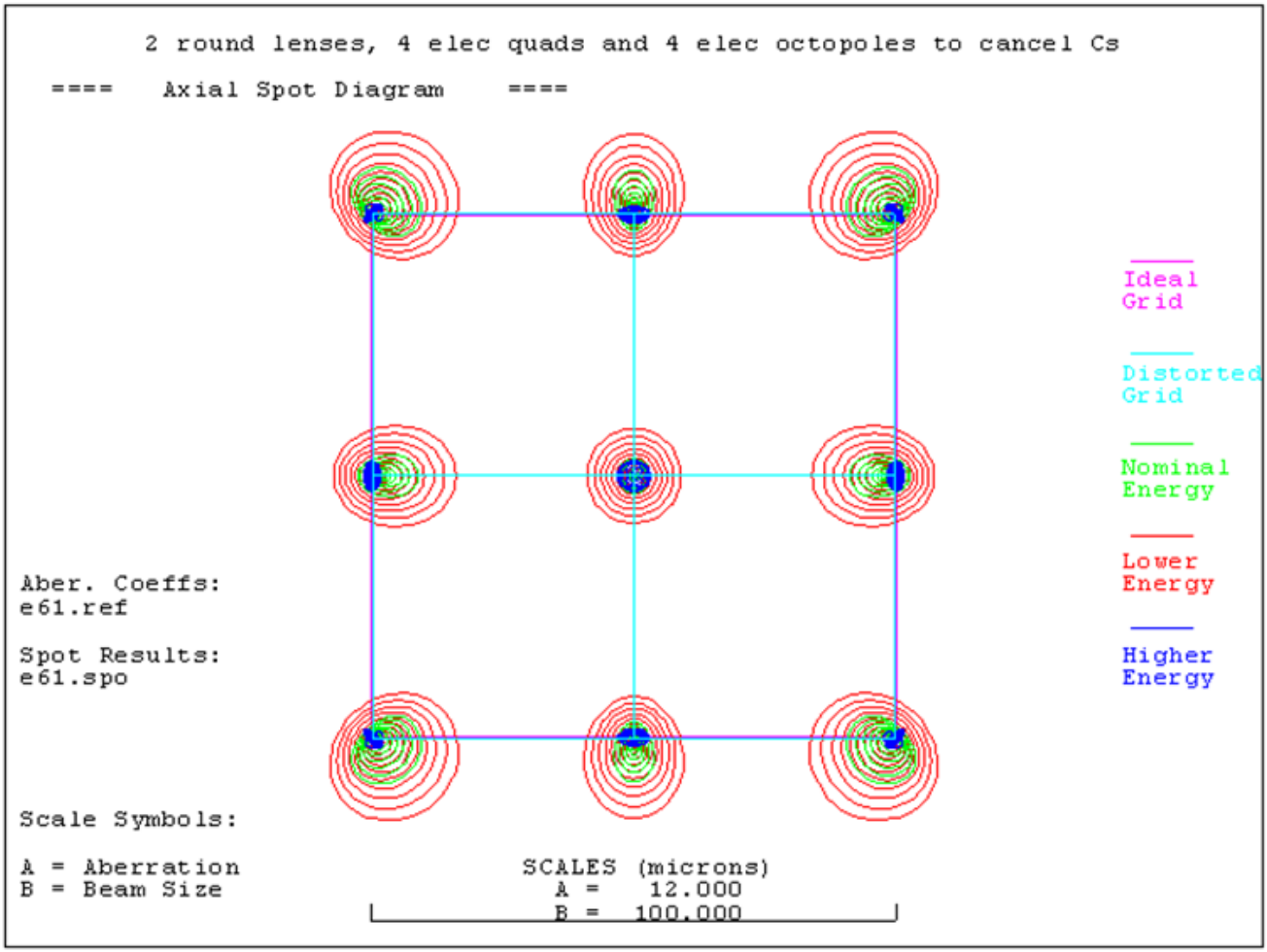
MULTIPOLE simulates the optical properties and aberrations of systems containing combinations of round lenses, multipole lenses and deflectors for aberrations up to 3rd-order. The lenses can be round, quadrupoles, hexapoles and octopoles.

The program uses as input a set of imaging conditions specified by the user, together with the field functions of the round and multipole lenses. These fields are computed with our SOFEM and 3D software packages.

The first-order optical properties are computed by numerical solution of the paraxial ray equation and the primary aberrations are computed by evaluating appropriate aberration integrals involving the paraxial rays. The computed geometric aberrations are second and third-order aberrations, if hexapole lenses are present, and third-order aberrations, otherwise.

The program can handle both Gaussian round-beam and shaped-beam systems. The output is the computed optical properties, including a table of the first-order optical properties and a table of the aberration coefficients.

MULTIPOLE also has an integrated aberration spot generator to visually show the aberration effects using the computed aberration coefficients and given initial image conditions, such as beam half angle, beam size, deflection parameter at either object or image plane.



The aberration spot diagram for a multipole column containing 2 electrostatic round lenses, 4 electrostatic quadrupole lenses and 4 electrostatic octopole lenses to cancel Cs.