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A FINAL FOCUS MODEL FOR HEAVY ION FUSION DRIVER SYSTEM CODES*

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The need to reach high temperatures in an inertial fusion energy (IFE) target (or a target for the study of High Energy Density Physics, HEDP) requires the ability to focus ion beams down to a small spot. Systems models indicate that within the accelerator, the beam radius will be of order centimeters, whereas at the final focal spot on the target, beam radii of order millimeters are required, so radial compression factors of order ten are required. The IFE target gain (and hence the overall cost of electricity) and the HEDP target temperature are sensitive functions of the final spot radius on target. Because of this sensitivity, careful attention needs to be paid to the spot radius calculation.We review our current understanding of the elements which enter into a systems model (such as emittance growth from chromatic, geometric, and non-linear space charge forces) for the final focus based on a quadrupolar magnet system. We also outline how the systems model may be extended to axisymmetric focusing (such as solenoidal and plasma lens focusing).

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