

Abstract Submitted
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Collimating Relativistic Electron Beams for Fast Ignition with Elliptical Magnetic Mirrors¹ HOLGER SCHMITZ, ALEX P.L. ROBINSON, Central Laser Facility, STFC Rutherford Appleton Laboratory, Didcot OX11 0QX — The Fast Ignition concept relies on the energy of the high energy electrons being delivered inside a small region in the fuel core. Large angular spreads of the forward moving electrons result in a reduction in the coupling efficiency into the core. In order to counteract this effect, measures have to be taken to concentrate the electrons towards the hot spot. A new elliptical mirror target geometry is presented that focuses electrons using self generated magnetic fields at resistivity gradients. Initial 2.5 dimensional collisional PIC simulations provide a proof of concept. It is shown that electrons are collimated rather than just channelled inside the high-Z material. Large scale hybrid simulations, with realistic length and time scales, assess the performance of the magnetic mirror concept under more realistic conditions. An increase of the coupling efficiency by a factor of 3 to 4 is found. The results show that the elliptical mirror concept is able to improve the prospects of Fast Ignition considerably.

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Holger Schmitz
Central Laser Facility, STFC Rutherford Appleton Laboratory,
Didcot OX11 0QX

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