



Orion: Target diagnostic

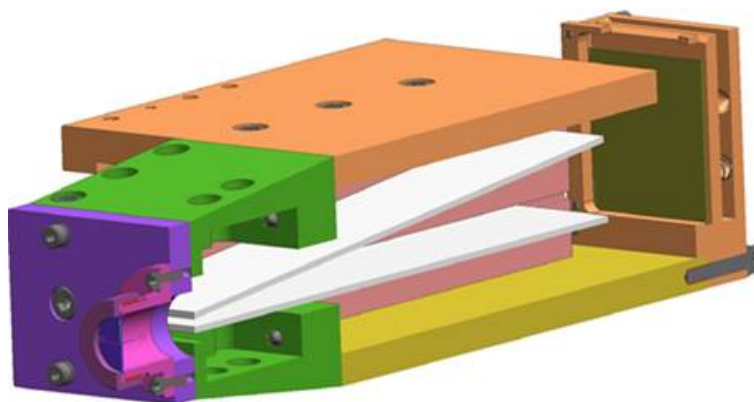


Thomson Parabola

The Orion laser facility at AWE Aldermaston, one of the largest scientific capital investments in the UK, houses a large neodymium glass laser system and a target chamber in which the high energy density physics experiments are performed. This is necessary to support certification of performance and safety of the UK deterrent.

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The Thomson Parabola is used to record charged particle spectra generated by Orion during laser/plasma interactions. It is deployed in one of the Ten Inch Manipulators (TIMs) attached to the Target Chamber. The Thomson Parabola is a charged-particle-discrimination spectrometer that employs parallel electric conducting plates held at a potential of several kilovolts to disperse ions by charge-to-mass ratio and a matched pair of permanent magnets to orthogonally deflect moving ions to provide velocity-based dispersion.



Specification

TIM based

Applied voltage:	1.6 - 10 kV
Magnetic field strength:	0.15 T / 0.78 T
Energy range (protons):	100 keV - 10 MeV
Detector material:	CR-39

The diagnostic uses CR39 as a detection medium, mounted in a cassette at the rear of the device. Ions of a particular species form a series of pits ~20 mm or 20 microns in diameter in the CR39, dispersed by energy along a parabolic shape. The CR39 is then processed to reveal the 'tracks' from which the energy and species of the ions can be measured.