



## **Orion:** Target diagnostic

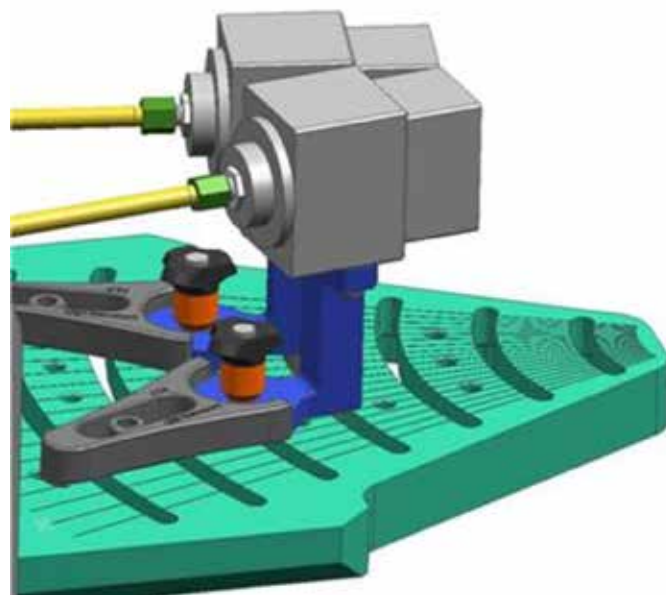


## **Faraday Cups**

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.

[www.awe.co.uk](http://www.awe.co.uk)

The primary purpose of the Faraday cups is to measure the protons produced in short pulse laser interactions. When a charged particle beam enters a Faraday cup and impacts on its collector plate the beam current can be calculated from the measured voltage change of the cup. The Faraday cups are mounted in a Ten Inch Manipulator (TIM); and are designed to be fielded in pairs with differential filtering. The cups have housings that give the option for sweeping magnets to be placed around them to remove electrons from the approaching beam. To minimise activation of the cups by the proton beam itself they are fielded behind RCF film.



### Specification

TIM based

Internal turning magnet: 6 mT

External turning magnet: 16 mT

Time resolution: <1 ns

Time-of-flight measurements are used to extract the energy spectrum of the protons and so the cups are placed at various radial distances from the Target Chamber Centre. The cups are deployed in a TIM and can be placed both close to the target (<100 mm) or at a distance of >2000 mm. The distance is adjusted depending on the type of experiment being conducted to obtain optimum signal levels.