



Contribution ID: 136

Type: poster

## Novel spectrometer design for laser driven ion acceleration diagnostic

*Monday, September 16, 2019 7:00 PM (1 hour)*

The continuous development of high power lasers ( $I > 10^{22}$  W/cm<sup>2</sup>) allow to accelerate multi-species charged particles to higher and higher energies. For this new interaction regime nowadays it become crucial to develop diagnostic systems for comprehensive characterisation of plasma processes and ion acceleration phenomena for the range of energies not explored before.

The main goal of this work is to propose a novel spectrometer design for laser driven particles diagnostic capable of detecting the proton spectra from few MeV up to few hundreds MeV. For that purpose different sequences of magnetic and electric field profiles have been studied systematically varying the fields' parameters, through finite element numerical simulations. The optimized parameters of the spectrometer allow a study of high energetic particle emission from ultra-intensity laser-matter interaction in a broad energy range providing high energy and species resolution in highly resolved spatial and temporal domain.

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**Session Classification:** Cheese and Wine Poster Session 1

**Track Classification:** WG5 - Plasma devices, plasma and beam diagnostics