**EUV Spectra of Gadolinium Laser Produced Plasma**

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**1. Introduction**

- Development of sources below 13.5nm is a challenge for EUVL.
- EUV emission at 6.xnm could be coupled with a La/B₄C multi layer mirror to make a next generation light source.
- Gadolinium has been previously shown to have large UTA emission peaking at 6.75nm[1,2]

**2. Experimental Setup**

- A 160ps, 1064nm, Nd:YAG laser pulse with energy of 450mJ irradiated the target.
- A range of power densities was achieved by varying the lens – target distance.
- Spectra from the plasma were analysed using a 2-meter grazing incidence soft x-ray spectrometer, shown in figure 3[3].

**3. Atomic Calculations**

- Cowan code spectral output was weighted with CR model [4] ion fractions to give theoretical spectra at various nₑ and Tₑ
- A range of power densities was achieved by varying the lens target distance.
- UTA statistics of Cowan code calculations show that 4d - 4f, 4p – 4d are the main contributing transitions in the 6.x-nm region.

**4. Theoretical Spectra**

- Experimental spectra from Gd₂O₃ plasma along with theoretical calculations[3] are shown in figure 4
- An electron temperature of 200 eV was found to give the best agreement with experiment

**6. Future Work**

- Further spectral analysis
- Absolute intensity measurements will be made with a photodiode and Mo/B₄C coupled detector. This will allow the measurement of conversion efficiency.
- Ion emission will be characterised using an electrostatic spherical sector analyser.

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