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To cite this article: M F Gharaibeh *et al* 2015 *J. Phys.: Conf. Ser.* **635** 092074

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## K-Shell Photoionization of the Oxygen Isonuclear Sequence

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**Synopsis** K-shell photoionization cross-section measurements for the oxygen isonuclear sequence from N-like to Li-like made at the SOLEIL Light Source are compared with SUNC, MCDF and R-matrix calculations.

Single and multiply ionization stages of C,

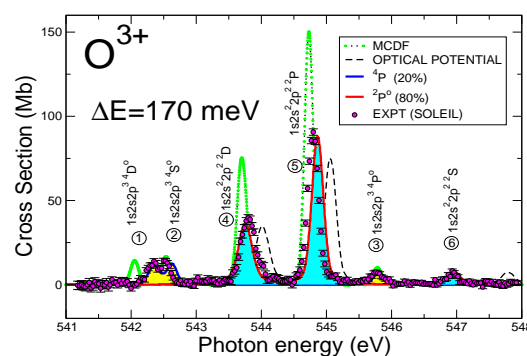
of results will be presented at the meeting.

N, O, Ne and Fe have been observed in the ionized outflow in the planetary nebulae NGC 4051, measured with the satellite XMM-Newton in the soft-x-ray region, the Seyfert galaxy NGC 3783, including UV imaging, x-ray and UV light curves, the 0.2 -10 keV x-ray continuum, the iron K-emission line, and high-resolution spectroscopy in the modelling of the soft x-ray warm absorber [1, 2].

Detailed measurements of the absolute K-shell single photoionization cross sections for N-like to Li-like oxygen ions obtained (for the first time) at the SOLEIL synchrotron radiation facility are compared with theoretical predictions made using the SCUNC, MCDF and RMPS methods. The theoretical work enables the identification and characterization of the very strong  $1s \rightarrow 2p$  transitions found in the spectra of these ions and other resonance features observed below the K-edge region in most of these ions.

The first measurements in the isonuclear sequence for  $O^{3+}$  were published recently [3], the experimental and theoretical data for the  $O^+$  and  $O^{2+}$  ions are in preparation. The  $O^{4+}$  and  $O^{5+}$  will be explored in May 2015 and all this data will be presented at the conference.

Fig. 1 illustrates the cross section results in the region of the  $1s \rightarrow 2p$  transition for B-like oxygen. Further details and a comprehensive set



**Figure 1.** (Colour online) Photoionization cross sections for  $O^{3+}$  ions measured with a 170 meV band pass in the region of  $1s \rightarrow 2p$  photo-excitations. Solid points (magenta), experimental cross sections. The R-matrix (RMPS, solid red line, and blue line) results. Dotted line with solid green circles the MCDF calculations. The optical potential R-matrix results (dashed black) are from Garcia and co-workers [4]. Theoretical work was convoluted with a Gaussian profile of 170 meV FWHM and an appropriate weighting of the ground and metastable states to simulate the measurements [3].

### References

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