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**Synopsis** Photoionization measurements of $NO^+$ at Nitrogen K-shell, performed at the SOLEIL Light Source will be presented . The main observed structure corresponds to the 1s to π* resonant transition.

Our knowledge on the Universe is carried to us by photons, which are dispersed and detected by the orbiting Chandra and XMM-Newton satellites [1]. Molecular ions have major influence in the chemistry of planetary atmospheres, as well as in astrophysical and laboratory plasmas. The accurate knowledge of their electronic structure and of their photoexcitation cross sections is of crucial importance to evaluate their chemical reactivity. Nitrogen and Oxygen are from the most abundant gasses in the space as well as the NO molecules.

Combining a merged ion-photon beam endstation [Permanently installed on PLÉIADES Beam-line] and named by MAIA (Multi-Analysis Ion Apparatus) with an electron-cyclotron-resonance ion source and a third-generation synchrotron radiation source makes possible high quality quantitative studies of photo-ionization of singly and multiply charged ions. We are going to present our recent study of molecular ions ($NO^+$). The PLÉIADES BL covers the photon energy range required to investigate photon studies of K-Shell region of Nitrogen and Oxygen, in particular measurements for photoionization of $NO^+$ by detecting the $N^{2+}$ fragment in the photon range of the nitrogen K-shell. We found the fragmentation channel of $O^{2+}$ having similar intensity in this energy range. Up to our knowledge the only previous studies on photoionization of NO molecule were performed on neutral molecules and not in ionic state. MAIA setup has already shown its capability to study the inner-shell photoexcitations of molecular ions such as $CH^+$, $OH^+$, and $SiH^+$[2].

We managed to detect the $N^{2+}$ fragments produced in the Nitrogen K-shell PI of $NO^+$ in the energy range 398-414 eV which covers the region of the 1s→π* excitation (See Figure 1).

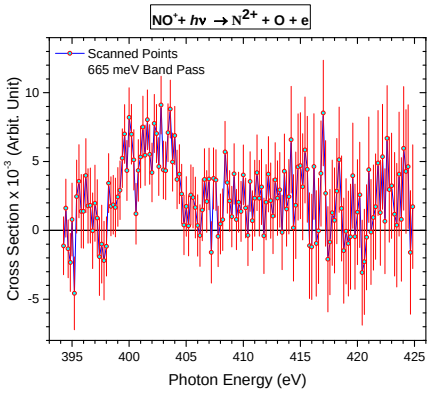


**Figure 1**. $N^{2+}$ fragments produced in the Nitrogen K-shell photoionization of $NO^+$ in the energy range 398-414 eV with 670 meV band pass.

## References

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