Laboratory VUV Spectra of Heavy Element Ions. Examples.


Heavy elements such as lanthanides and actinides are present not only in stellar atmospheres but also in the ejected matter of two neutron star mergers. They have complex spectra and therefore important contribution to opacities. The knowledge of their energy levels is a starting point for studying their radiative and collisional properties for plasma modelling. Experimental and theoretical studies of high resolution VUV emission spectra from several heavy element ions are in progress in our collaboration team. High resolution spectra are recorded using vacuum spark source and the 10.7 m vacuum spectrograph of the Meudon Observatory in the wavelength range of 170Å-2900Å. Analyses of spectra are carried out with the help of parametric calculations of atomic configurations using the Cowan codes including configuration interactions. This leads to the experimental determination of energy levels, and to good predictions of unobserved energy levels, Landé factors and transition probabilities. Examples of recent results from some lanthanide ions and uranium ions will be reported.