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Dielectronic recombination (DR) is the process of capture of a free electron by an ion with simultaneous excitation of a bound electron and subsequent emission of a photon. Measurements of DR recombination rates of Li-like uranium ions with free electrons have been carried out by Brandau et al. at GSI [1,2]. We calculated DR cross sections in lowest order perturbation theory in the isolated resonance approximation. The method is published in Ref.[3,4].
In fig.1 we show experimental [1,2] and theoretical recombination rates for Li-like U ions in the range of electron energies of 2-14 eV. In this region one finds the transitions from the ground state $1s^22s_{1/2}$ to excited states with configurations $1s^22p_{3/2}5l_{j=3/2}$ and $1s^22p_{1/2}20l_{j'}$. The theoretical DR rate coefficient has been calculated by convoluting the theoretical DR cross section with an anisotropic Maxwellian electron velocity distribution parameterized by $kT_{\|}$=1 meV and $kT_{\perp}$=110 meV. The resonance energies were calculated with the multiconfiguration Dirac-Fock program GRASP [5,6]. The theoretical energies have been shifted to lower values by 0.5 eV in order to get a better agreement with the experimental data. Agreement between experiment and theory is good. The difference in the width for the peak at 9 eV is not yet explained.
Fig.2 shows experimental and theoretical recombination rates for Li-like U ions in the range of electron energies of 70-85 eV. In this region one finds the transitions from the ground state $1s^22s_{1/2}$ to excited states with $1s^22p_{3/2}5l_{j=5/2}$ configurations. The shapes and the heights of the peaks in the calculated rates are in excellent agreement with the experimental results.
In fig.3 we show experimental and theoretical recombination rates for Li-like U ions in the range of electron energies of 29-38 eV. In this region one finds the transitions from the ground state $1s^22s_{1/2}$ to excited states with $1s^22p_{1/2}21l_{j'}$ configurations. Theoretical and experimental results are also in good agreement.

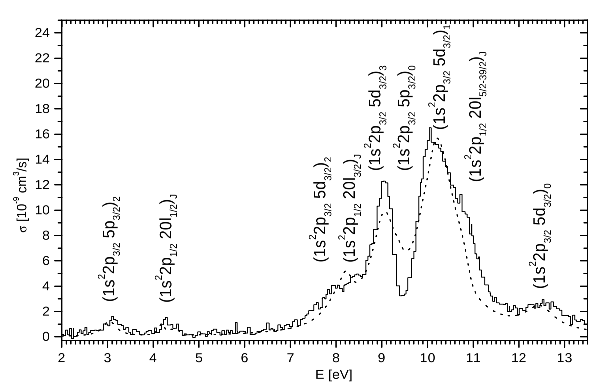

Figure 1: Experimental (full curve) and theoretical (dotted curve) dielectronic recombination rates for $e^- + U^{89+}(1s^22s_{1/2}) \rightarrow U^{88+}(1s^22p_{3/2}5l_{j=3/2}) \rightarrow U^{88+} + \gamma$ and $e^- + U^{89+}(1s^22s_{1/2}) \rightarrow U^{88+}(1s^22p_{1/2}20l_{j'}) \rightarrow U^{88+} + \gamma$.

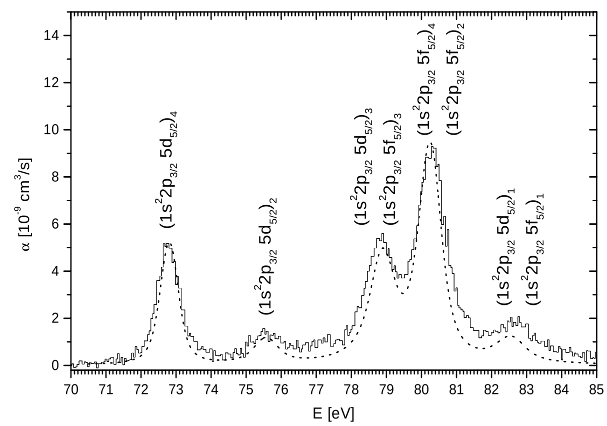

Figure 2: Experimental (full curve) and theoretical (dotted curve) dielectronic recombination rates for $e^- + U^{89+}(1s^22s_{1/2}) \rightarrow U^{88+}(1s^22p_{3/2}5l_{j=5/2}) \rightarrow U^{88+} + \gamma$.

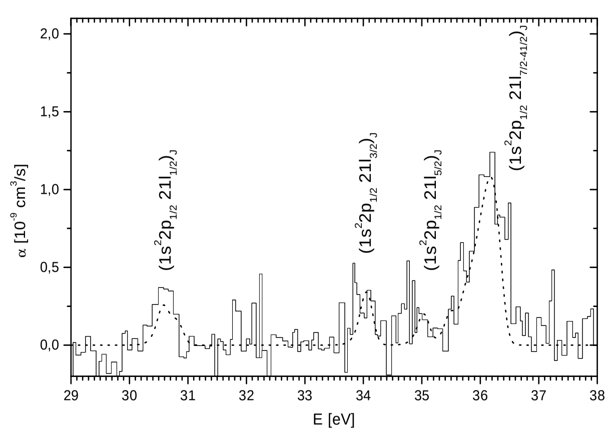

Figure 3: Experimental (full curve) and theoretical (dotted curve) dielectronic recombination rates for $e^- + U^{89+}(1s^22s_{1/2}) \rightarrow U^{88+}(1s^22p_{1/2}21l_{j'}) \rightarrow U^{88+} + \gamma$.

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