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3 - 2 Dielectronic Recombination of Be-like $^{40}Ar^{14+}$ at the CSRm*

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The total recombination rate coefficients of Be-like $^{40}Ar^{14+}$ ions have been measured by employing the electron-ion merged-beams technique at the heavy ion storage ring CSRm at IMP. Fig. 1 shows the recombination spectrum for electron energy from 0 to 58 eV in the center-of-mass frame. The resonant capture, involving the core excitation of an electron and two electrons, which is termed dielectronic recombination (DR) and trielectronic recombination (TR) individually and leads to series of peaks, have been preliminarily identified by extending downward in energy from their series limits with the Rydberg formula[1]. We have also observed surprisingly strong low energy trielectronic recombination resonances at the relative energy around 1 eV, which is comparable in strength to their dielectronic counterparts. Above the dielectronic recombination series limits, the strength of TR drops dramatically and beyond the observation. For a better understanding of the spectrum, a theoretical calculation using the atomic-structure code AUTOSTRUCTURE[2] has been carried out by N R Badnell's group. The detailed data analysis is in progress.

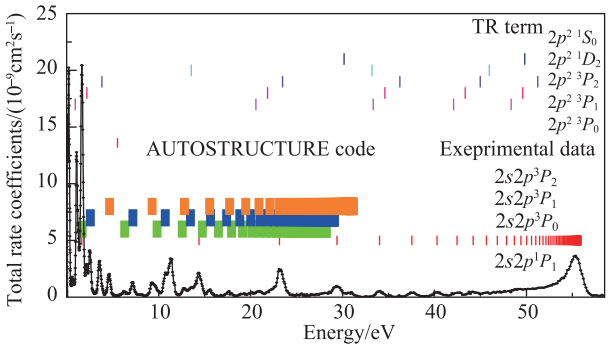

Fig. 1 (color online) Measured recombination spectrum of Be-like $^{40}Ar^{14+}$ versus the relative energy in the c.m. frame. Resonance positions based on the Rydberg formula are indicated by vertical short bar involving the spectrum for both dielectronic ($2s^2 \rightarrow 2s2p$) and trielectronic ($2s^2 \rightarrow 2p^2$)Δn=0 recombination. The gray area is the convolved rate coefficients calculated by AUTOSTRUCTURE code.

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