

Dielectronic Recombination: from HIRFL-CSR to HIAF

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Dielectronic recombination (DR) has been developed as a powerful spectroscopic tool for study of highly charged ions (HCI). The newly twin-electron-beam technique invented at the TSR leads to a significant improvement of the DR experimental energy resolution. The electron beams created from a separate ultra-cold electron target can be much colder as compared to electron-beam produced from the thermal cathode electron gun. In addition, the electron cooler can be used to cool the ion beam continuously during the measurement with the electron-target. Based on the experience of the present DR experiments at the CSRm, the upgrading of the electron cooler (300 kV) of the CSRe for DR experiments with HCI and even radioactive ions is in progress. Moreover, the DR experiment is being planned and designed on the High-Intensity heavy ion Accelerator Facility (HIAF) by combining an electron-cooler and an electron-target at the SRing. The combination of an electron-cooler and an separate electron-target on HIAF will provide a unique platform for DR experiments of HCI, and will also enhance the DR resonance technique to investigate the strong field QED, relativistic effects and nuclear properties. We will present the preparation of the DR experiments at the CSRe and give an overview of the DR experiments plans on HIAF.

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