

(1) He原子の 2^3S 状態の電子励起微分断面面積の
 高エネルギー・微小散乱角における異常な振る舞い
 について

Y.Sakai et al.

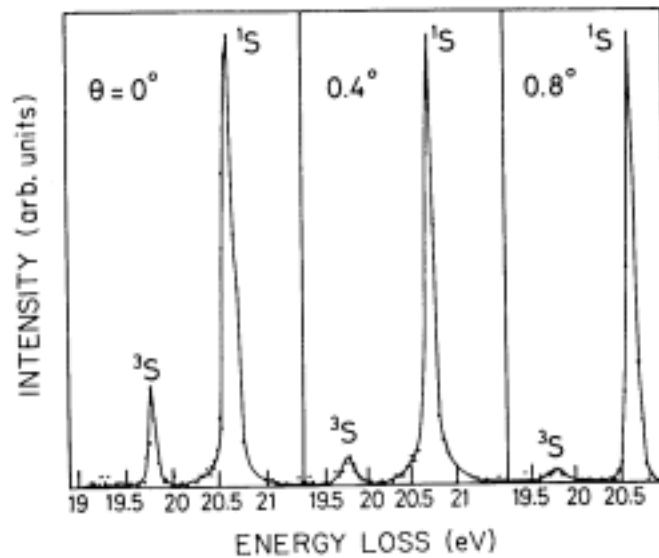


FIG. 4. Typical energy-loss spectra for the 2^3S and the 2^1S excitation in helium at scattering angles of 0° , 0.4° , and 0.8° for 500-eV incident electrons. Intensity scale is normalized to the peak for the 2^1S excitation.

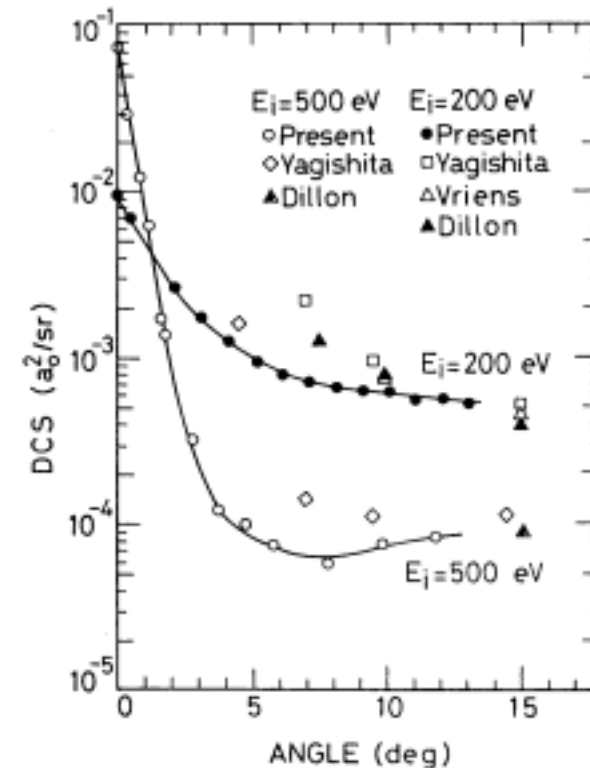


FIG. 5. Differential cross sections for the 2^3S excitation in helium as a function of the scattering angle for the incident electron energies of 200 and 500 eV.

(2) Xe の4d 電離の微分断面積と一般化振動子強度の測定

B.S.Min et al.

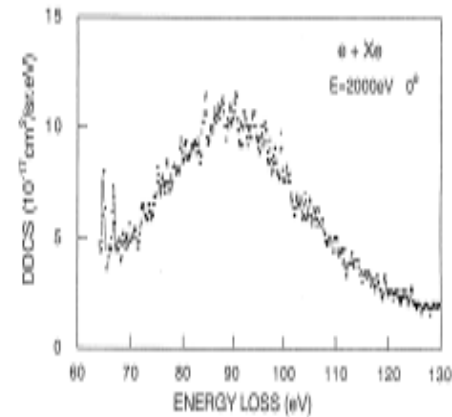
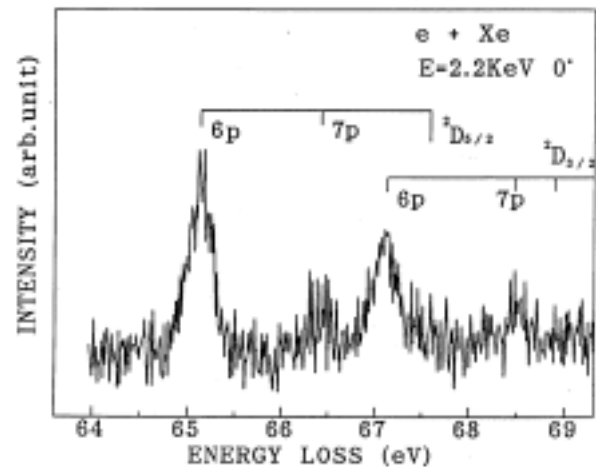
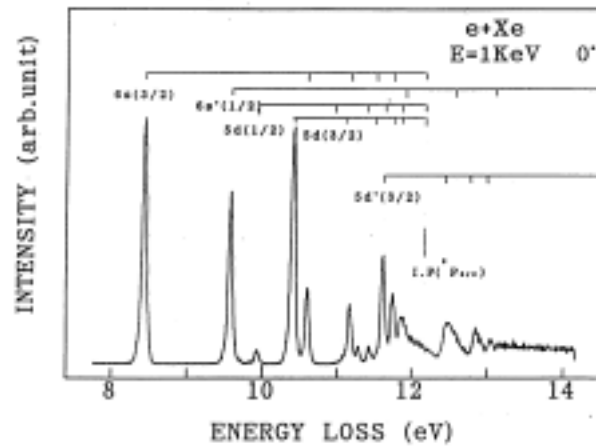


Fig. 6. The energy-loss spectrum for the 4d-ionization in xenon. The impact energy is 2 keV and the scattering angle $\theta=0^\circ$. The absolute scale of the DDCS is given on the vertical axis.

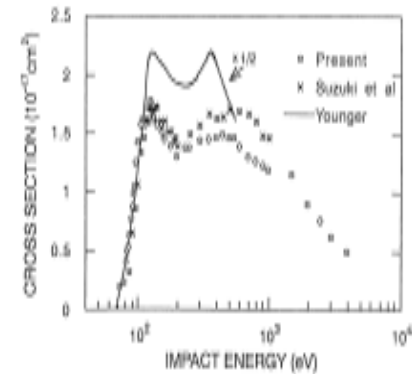


Fig. 10. The 4d-ionization cross sections as a function of the impact electron energy. The present results are compared with the previous experimental results of Suzuki et al.^(8,10) and theoretical calculation of Younger.⁽¹¹⁾

Auger 効果における PCI 効果 の詳細な研究

Y. Iketaki et al.

H. Ishii et al.

Ar LMMオージェ電子スペクトル

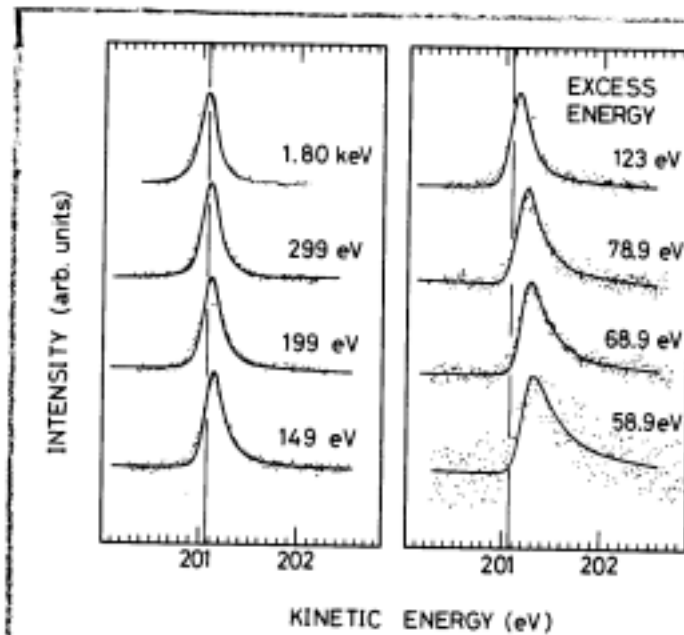
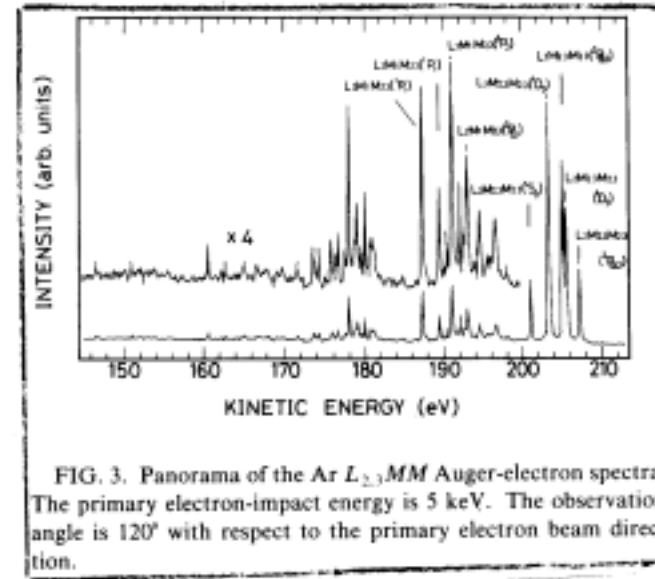


FIG. 6. The primary electron-impact energy dependence of the Ar $L_3M_{23}M_{23}$ (1S_0) Auger line shape. For notations, see Fig. 4.

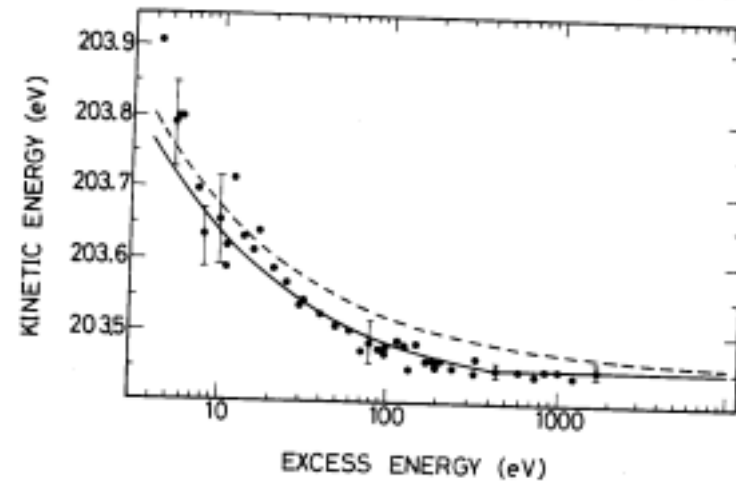


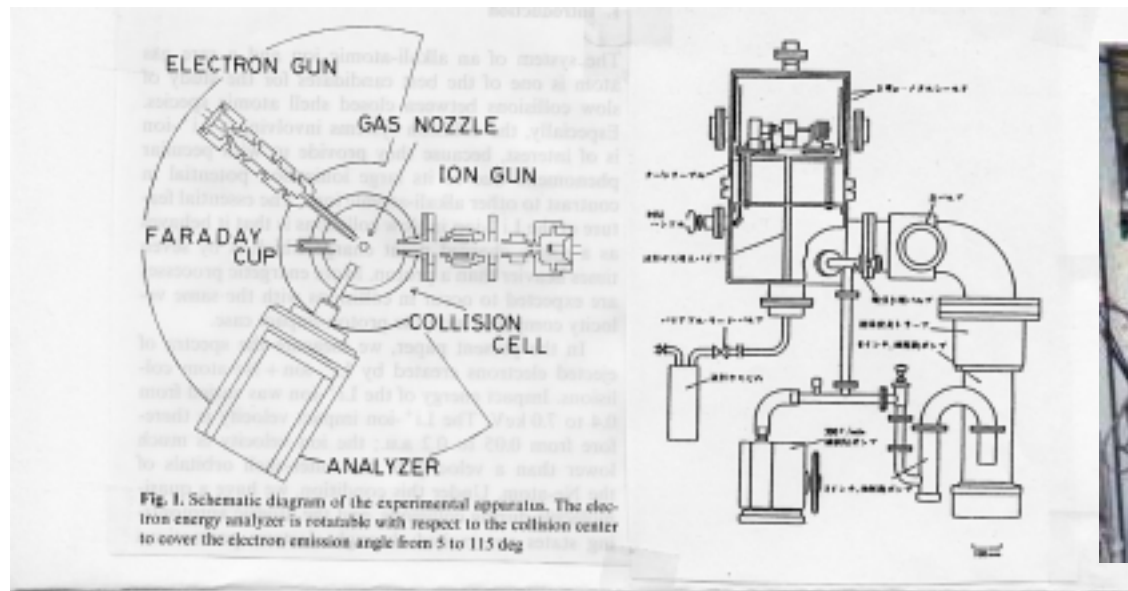
FIG. 9. The excess-energy dependence of the energy position of the Ar $L_3M_{23}M_{23}$ (1D_2) Auger line. For notations, see Fig. 7.

Ar LMMオージェ電子スペクトルの形とシフトの衝撃電子エネルギーによる変化

低エネルギーイオン-原子衝突による自動電離 およびオージェ電子放出に関する実験

同心半球形エネルギー分析器 軌道半径 30 mm
熱イオン放射式イオン源

A. Yagishita, H. Oomoto, A. Wada, H. Aizawa, M. Furune,
K. Wada, H. Sakaue, M. Sudo, Y. Ikezaki,



1) $\text{Li}^+ + \text{He}$ 衝突により生成する He-2 電子励起状態の放出電子スペクトル
 衝突中間過程（準分子状態）の解析 A.Yagishita et al.

2) アルカリ金属イオンと希ガス原子の衝突により生成する自動電離状態からの
 放出電子スペクトルの測定

$\text{K}^+ + \text{He}$, $\text{K}^+ + \text{Ne}$, $\text{Rb}^+ + \text{Ar}$, $\text{Cs}^+ + \text{Kr}$, $\text{Li}^+ + \text{Ne}$, $\text{Na}^+ + \text{He}$ etc

A.Wada et al. K.Wada et al. H.A.Sakaue, Y.Ikezaki et al.

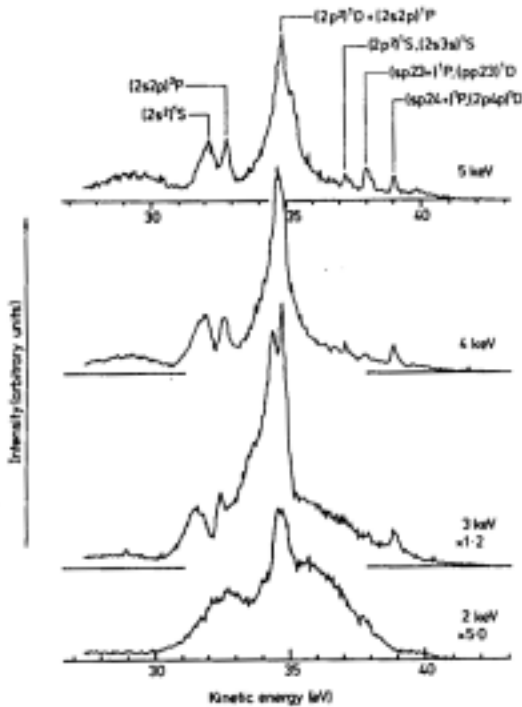
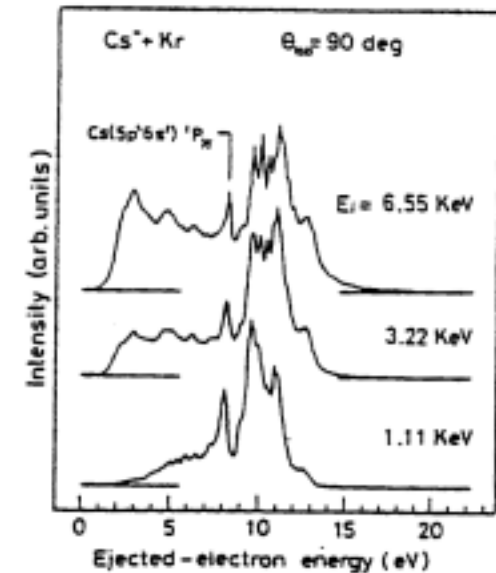
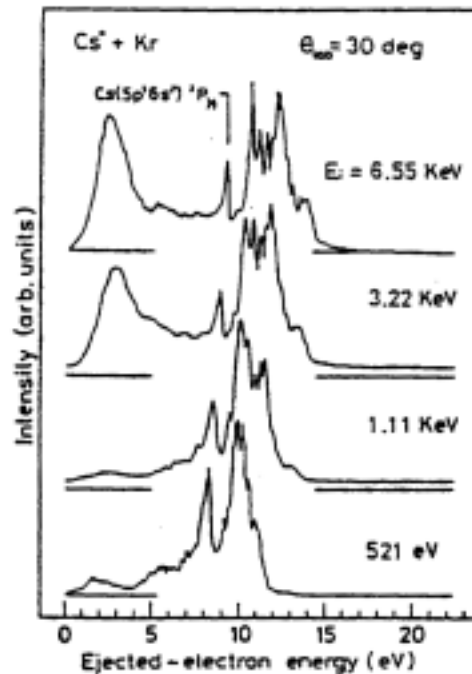


Figure 2. The ejected-electron spectra of He by various Li^+ impact energies at observation angle 10° .



$\text{Li}^+ + \text{He}$ 衝突で作られる
 He 2電子励起状態からの
 自動電離スペクトル

$\text{Cs}^+ + \text{Kr}$ 衝突で作られる $\text{Cs}5p^5 6s^2 2P_{3/2}$ 状態の Barker-Berry
 効果：エネルギーシフトから寿命が求められる

真空紫外分光法

1. 分子の光吸収・光電離断面積の測定

ヨウ素分子 I_2 (600-1000 Å), ベンゼンおよびスチレン (600 - 2000 Å)

2. 電子衝突による希ガス原子の副殻電離断面積の測定

Xe-5s, Kr-4s, Ar-3s, Ne-2s 電子の電離断面積

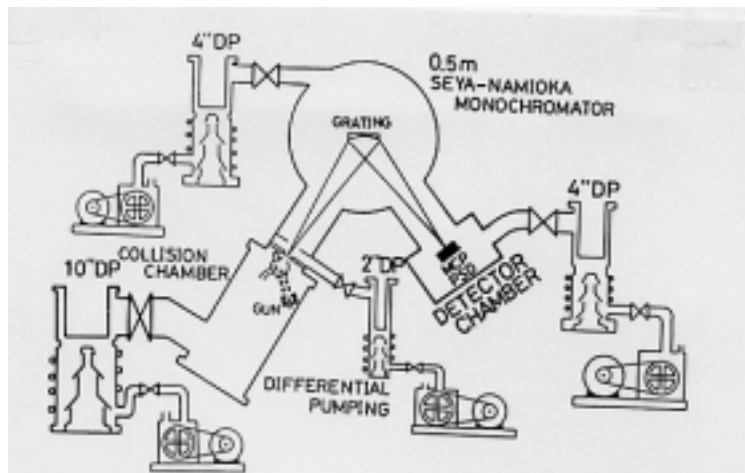


FIG.9. Schematic diagram of the VUV spectroscopic equipment used to determine the sub-shell ionization cross sections.

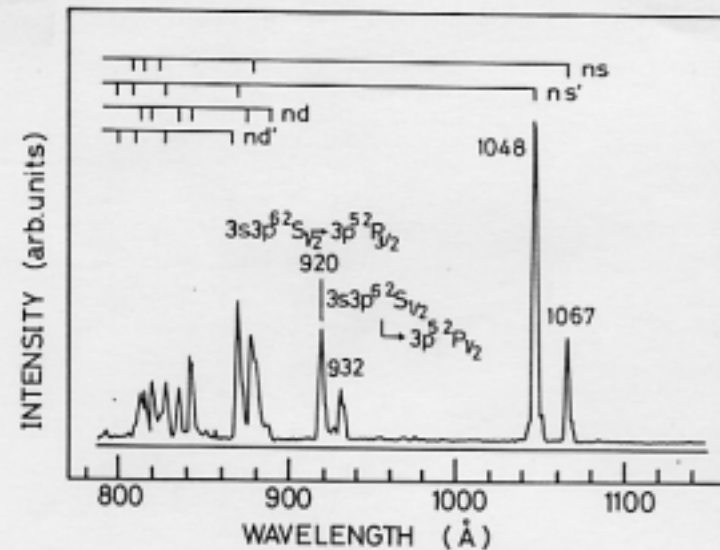


FIG. 2. An emission spectrum of argon taken at 100 eV electron impact energy. The 932-Å and 920-Å lines are due to the transitions $3s3p^6 2S_{1/2} \rightarrow 3p^5 2P_{1/2,3/2}$, respectively. Four resonance series (Ref. 26) $3p^5(^2P_{3/2})ns$, $3p^5(^2P_{1/2})ns$, $3p^5(^2P_{3/2})nd$, and $3p^5(^2P_{1/2})nd$ are also inscribed as ns , ns' , nd , and nd' , respectively.

希ガス原子の副殻電子電離断面積の測定

Y.Akagi, K.Morita, G.P.Li, F.Sumida, Y.Kooda, et al.

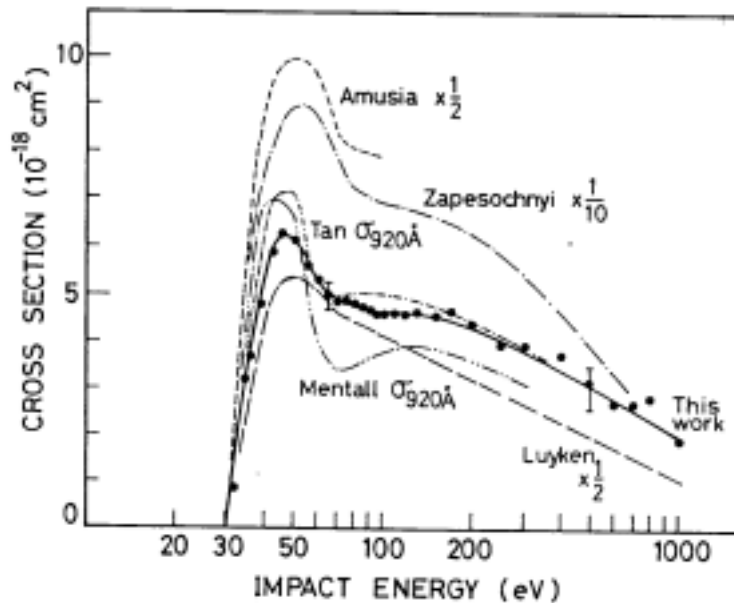


FIG. 7. Absolute cross section for the 3s ionization in argon. The closed circles on the smooth line are our data, the long-dashed line is the experimental result of Luyken *et al.* (Ref. 1) multiplied by $\frac{1}{2}$; the dotted-long-dashed line is the result of Zapesochnyi *et al.* (Ref. 2) multiplied by $\frac{1}{10}$; the dotted-short-dashed line is the result for the Ar^+ 920-Å line by Tan *et al.* (Ref. 3); the double-dotted line is the result for the Ar^+ 920-Å line by Mentall *et al.* (Ref. 4); the short-dashed line is the theoretical result by Amusia *et al.* (Ref. 9) multiplied by $\frac{1}{2}$. Some detailed comments are given in the text.

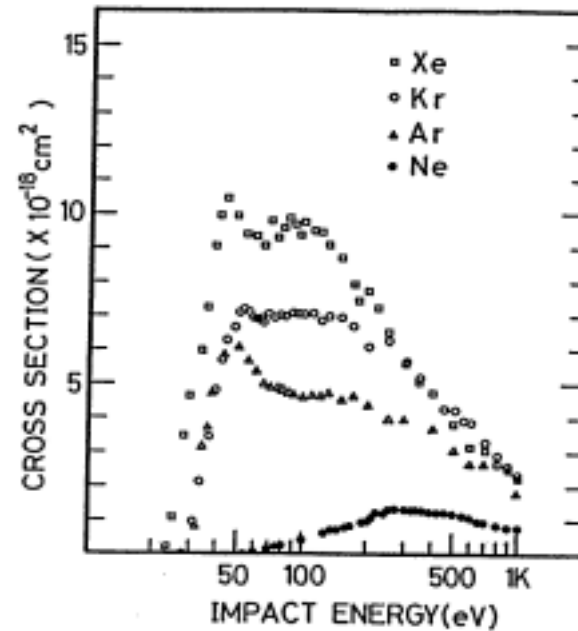


Fig.1. Partial ionization cross sections for 5s-electron in Xe, 4s-electron in Kr, 3s-electron in Ar, and 2s-electron in Ne, by electron impact.

Xe-5s, Kr-4s, Ar-3s, Ne-2s
電離断面積の衝突エネルギー依存性

Ar 3s電離断面積の衝突エネルギー依存性

電子-イオン衝突によるイオンの電離断面積の測定

交差ビーム実験

アルカリおよびアルカリ土類 1 価イオンの電子衝突多重電離断面積

表面電離型イオン源

上智大研究室

例：2重電離 $Ba^+ + e \rightarrow Ba^{3+} + 2e + e$

T.Hirayama, K.Oda, K.Morikawa,

イオン種：Ba⁺, Sr⁺, Ca⁺, etc

T.Ono, M.Ueno, S.Kohno, W.Ikehara et al.

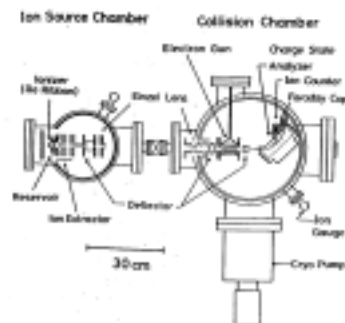
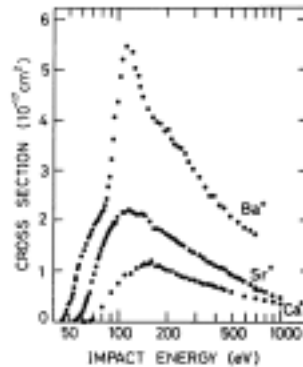


Fig. 1. Schematic diagram of the crossed-beam apparatus.



Ba⁺, Sr⁺, Ca⁺の2重電離断面積

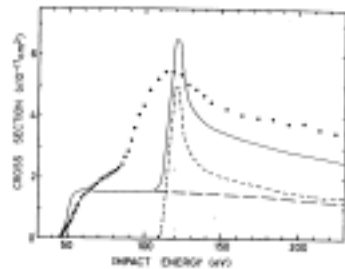
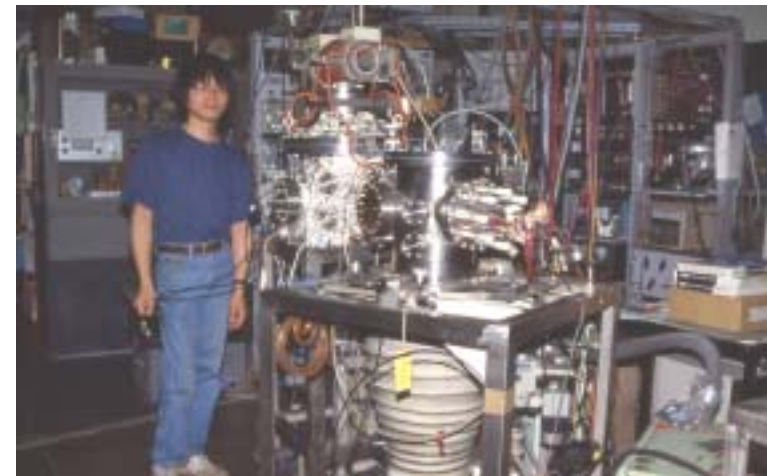


Fig. 4. Comparison of the experimental results with the theoretical calculation. Dashed curve—the 5s-ionization, dotted curve—the 4d-ionization, solid curve—the sum of the 5s and 4d contribution, closed circles—present experimental results.

FIG.4. Double ionization cross sections of alkaline-earth ions, Ba⁺ [Hirayama et al.⁶], Sr⁺, and Ca⁺ [Ikehara et al.¹⁵] as functions of electron impact energies.



交差ビーム実験装置

多価イオンの電子衝突電離断面積の測定 プラズマ研究所 交差ビーム実験装置

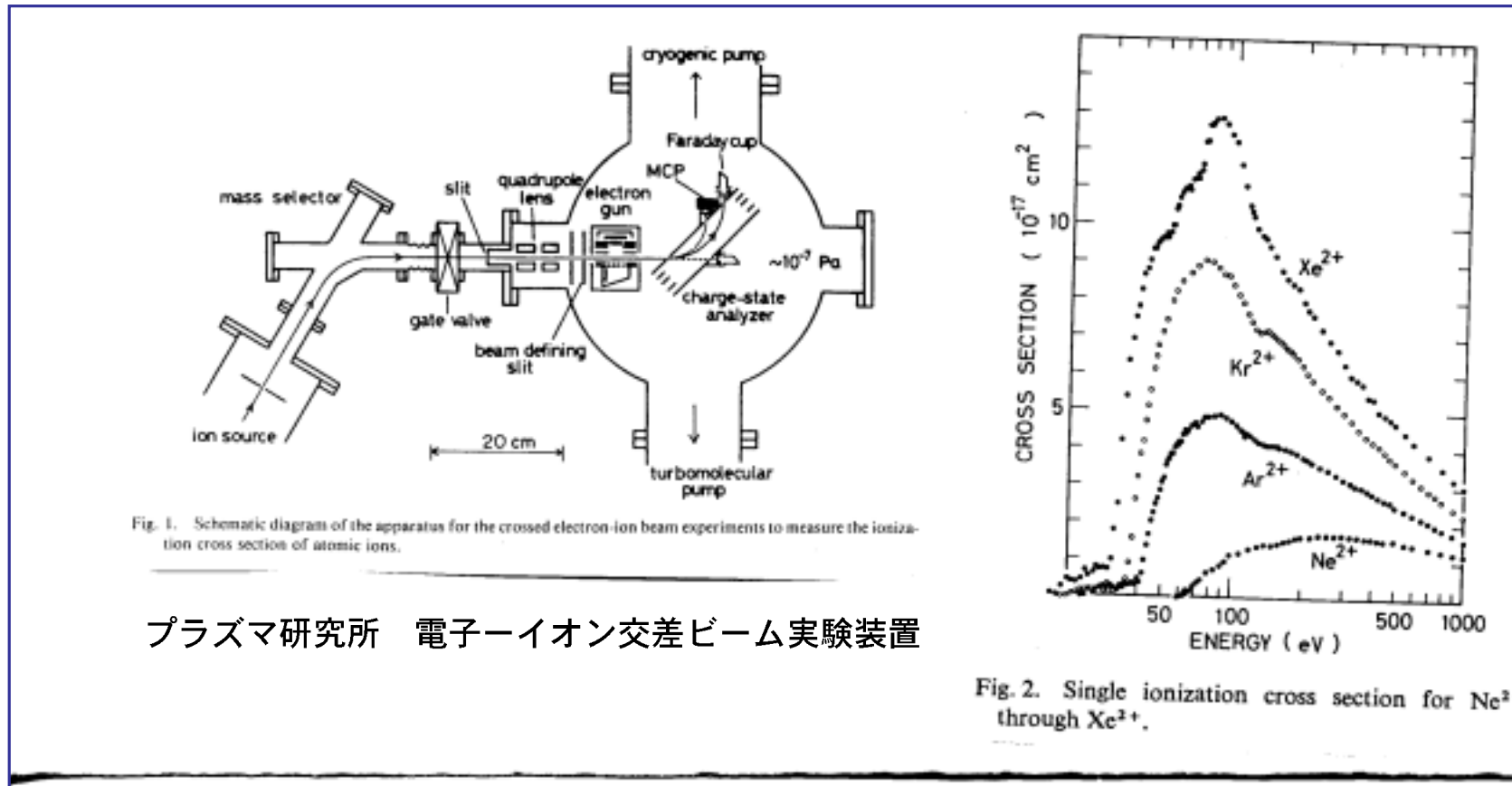
ECRイオン源

松本淳氏・山田一博氏

2価イオン Ne^{2+} , Ar^{2+} , Kr^{2+} , Xe^{2+} , S^{2+} , etc

1価イオン C^+ , N^+ , O^+ , F^+ , Ne^+ , S^+ , Cl^+ , etc

A. Matsumoto, I. Yamada, A. Danjo, T. Hirayama et al.

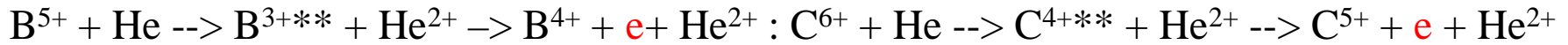


プラズマ研究所 電子-イオン交差ビーム実験装置

多価イオン-原子衝突による放出電子スペクトルの測定

理研ECRイオン源、平行平板形前置選別器、
疑似半球形エネルギー分析器 軌道半径104mm

完全電離イオン-原子衝突により生成する2電子励起ヘリウム様イオンの
エネルギー準位決定



H.A.Sakaue et al.

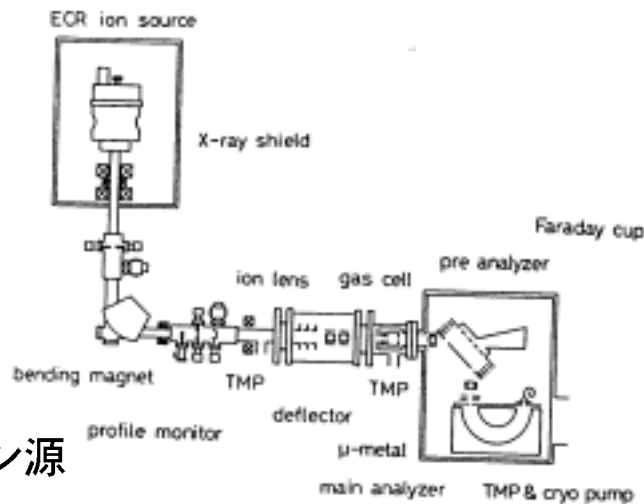


Fig.5. Schematic diagram of the experimental set up.

理研ECRイオン源

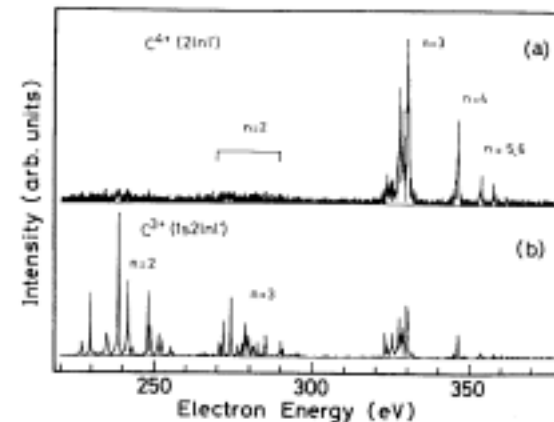


Fig. 1. Ejected electron spectra produced by the collision of C^{6+} with He atoms. (a) Spectra from $C^{4+}(2lnl')$ $n \geq 3$ configuration, obtained under the single collision condition. (b) Spectra obtained at the high target pressure. Auger peaks from the $C^{3+}(1s2lnl')$ $n \geq 2$ states are observed as well as the peaks from the $C^{4+}(2lnl')$.

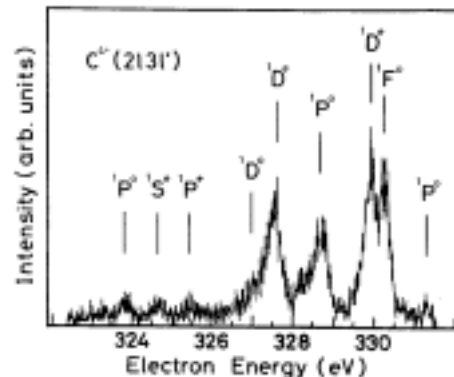


Fig. 2. High resolution ejected electron spectrum from the $2/3l$ configuration of C^{4+} .

$C^{4+}(2lnl')$, $n \geq 3$ からのスペクトル