
شبكة المعلومات الجامعية


# بسم الله الرحمن الرحيم


# شبكة المعلومات الجامعية

# التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

## يجب أن

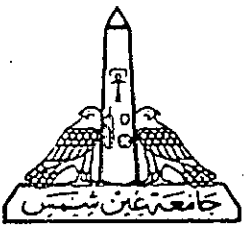
تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

**To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%**

# بعض الوثائـــــــق الاصليـــــة تالفـــة

# بالرسالة صفحات لم ترد بالاصل



Ain Shams University
Faculty of Girls
Physics Department

# SPECTROSCOPIC STUDIES FOR HIGH DENSE PLASMA



Presented
By

**HOSAM ABD EI-GWAD HEGAZY**
**Atomic Energy Authority**
**M.SC. 1992**

Ph.D. Thesis
( Physics )

## Supervisors

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1998

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بسم الله الرحمن الرحيم

وقل رب زدني علما

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   Nuclear Research Centre
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   ExperimentalPhysik V
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# ABSTRACT

The main interest of the study is to diagnose dense plasma by developed a spectroscopic method where other diagnostic techniques fail. Laser scattering is used with the spectroscopic study simultaneously.

The dense plasma is produced by liner z-pinch, where 11.1 μF, 25-40 kV, capacitor bank is discharged between two electrodes. The driver gas between the two electrodes is preionized by another discharge system. The test gas is injected at the center of the upper electrode along the axis by fast valve.

Laser scattering arrangement has been used to measure the plasma density and temperature of the plasma.

FWHM of $P_\alpha$ HeII is used to determine the electron density in helium plasma. Simplified approach is used to overcome the optical thickness of this line. Good agreement with density determined from laser scattering is obtained.

Wings of $L_\alpha$ line of hydrogen is used for the first time to get the electron density in hydrogen plasma. Both wings reveal an electron density in good agreement with the electron density determined from collective Thomson scattering.

Transitions between adjacent levels of high quantum numbers of ArVIII 5f-6g and 5g-6h with $\lambda$ = 115.47 nm and $\lambda$ = 116.39 nm, respectively have been developed. The measured width of both lines is 0.4 nm at electron density $3\times10^{18}$ $cm^{-3}$. It has been found that the line width varies with

density for both lines linearly as:

$$\frac{n_e}{10^{18}\ \text{cm}^{-3}} = 7.0 \times \frac{\text{FWHM}}{\text{nm}}$$

The lower transitions of ArVIII 3p-3d with wavelength 51.943 nm and 52.645 nm showed a linear relation between density and the Stark width in density range $1\times10^{18}$ - $5\times10^{18}$ $cm^{-3}$.