

Report of ITP program
the study on
Ruhr-University Bochum

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Nagoya University
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Content

Schedule

January 6 2010 – March 6 2010

<In this presentation>

1. Why I want to go Ruhr-University Bochum
(Dr. Uwe Czarnetzki Group)
2. Study in Ruhr-University
3. Life in Germany

<Target>

- Making good Communication in English
- Earning of the plasma physics

Why I want to go Ruhr-University Bochum

There is Centre for Plasma Science and Technology (CPST)

Knowledge of plasma physics

Capacitively Coupled Plasma (CCP), inductively coupled plasma (ICP) and micro hollow cathode discharge is analyzed by using the comparison of calculation and optical measurement.

Many good techniques

Emission spectroscopy,
Laser induced fluorescence method,
plasma is measured by many other methods.

Atmospheric pressure plasma

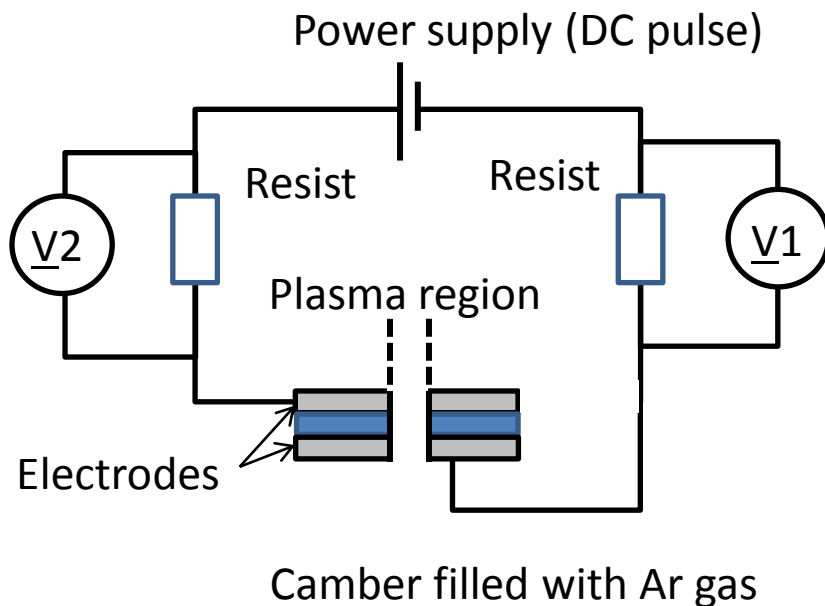
Low cost, many applications

**It is important to know the diagnostics of
Atmospheric pressure plasma.**

Study in Ruhr-University

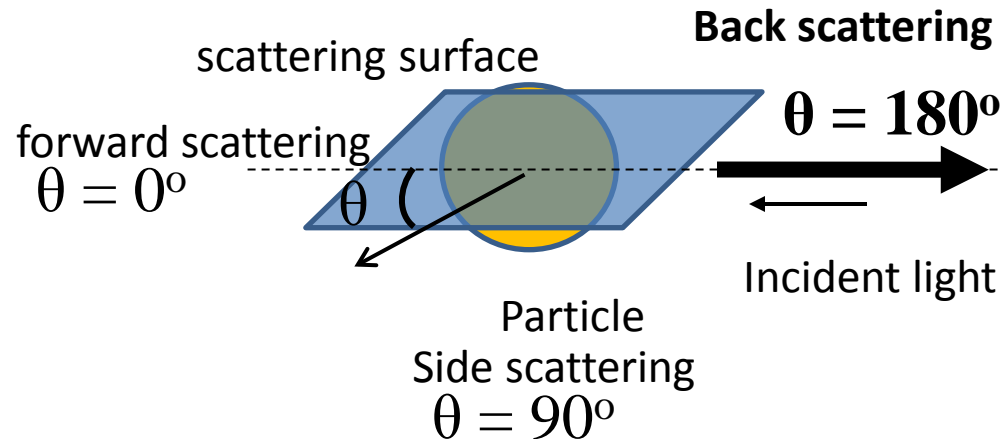
Micro hollow cathode discharge of Atmospheric pressure plasma

Measurement of breakdown voltage



Thomson Scattering

- very small region
- Atmospheric pressure
- small influence to plasma



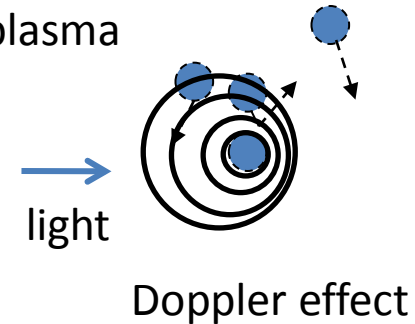
Thomson scattering

Thomson scattering of the electron in the plasma

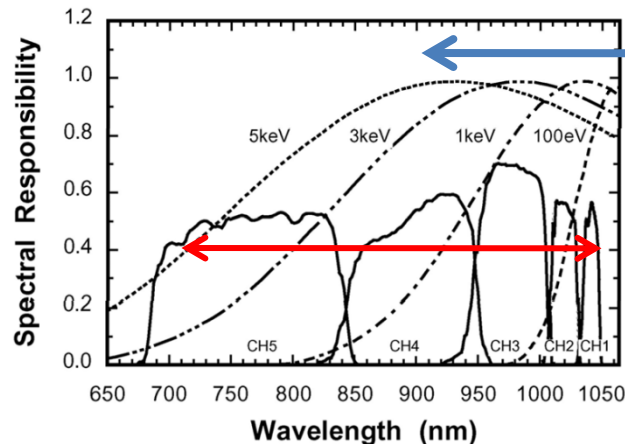
→Electrons are moving in the plasma

The scattering light is red shifted in Doppler effect.

If we can find the change of the wavelength,
electron temperature can be measured.



Important parameter to find FWHM(Full width at half maximum)



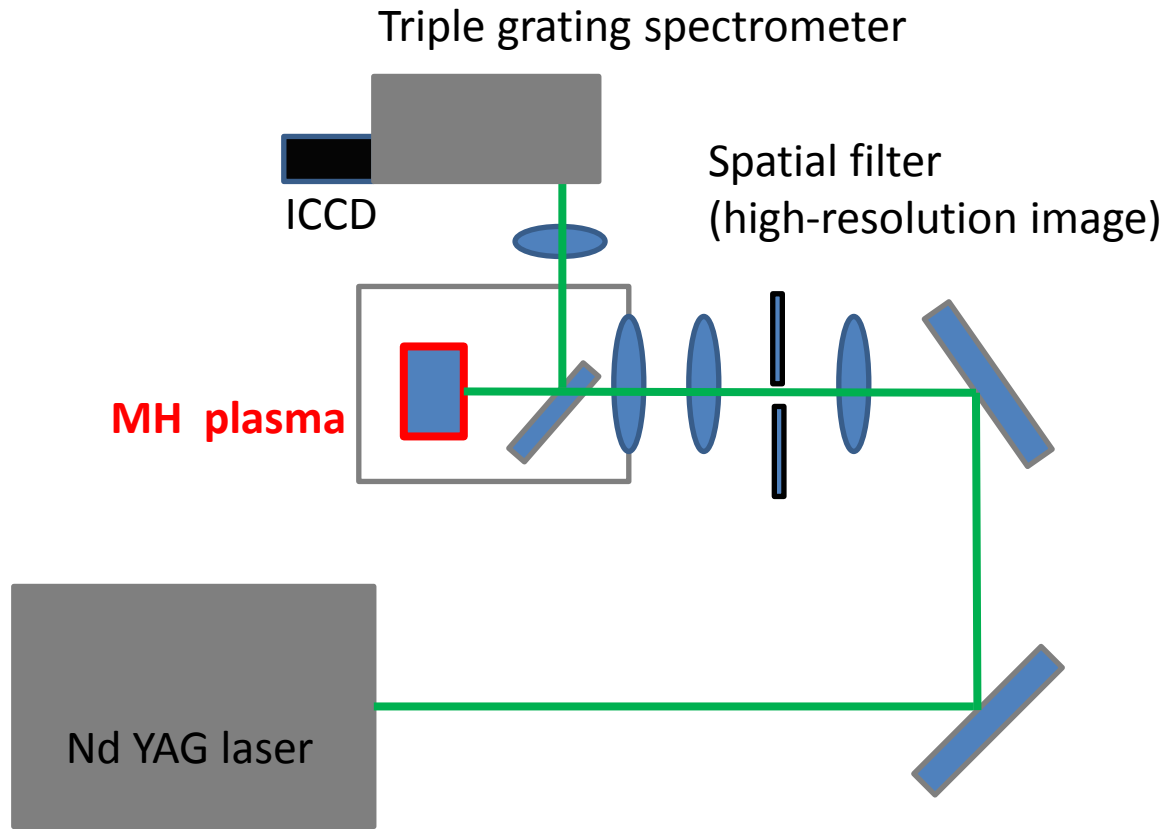
Peak position is shifted

Temperature is higher,
the width is longer.

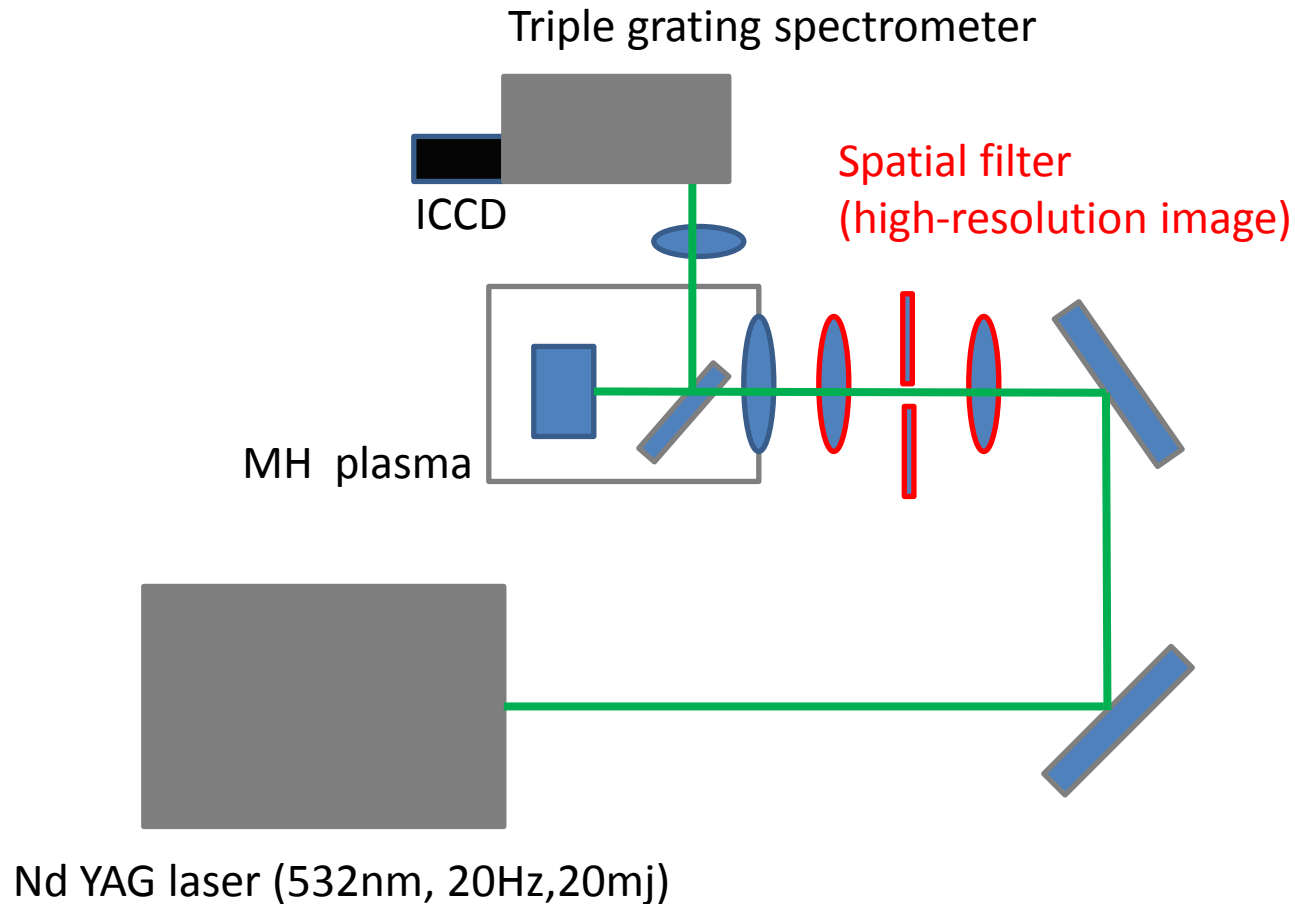
(Center of the peak moves .)

Thomson scattering setup

Thomson scattering using Nd YAG laser to measure electron density and electron temperature of Micro Hollow cathode Ar plasma.

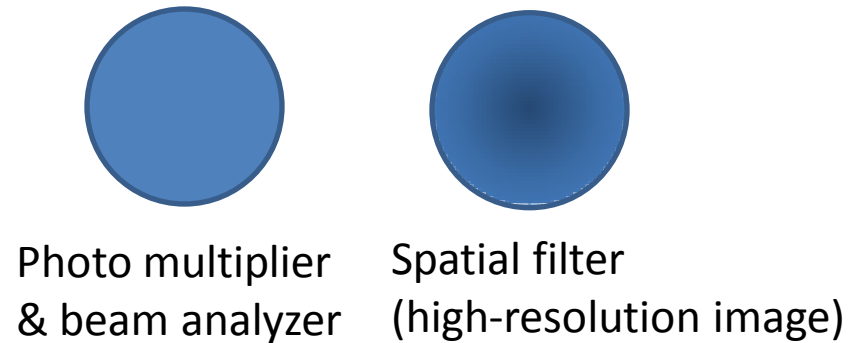
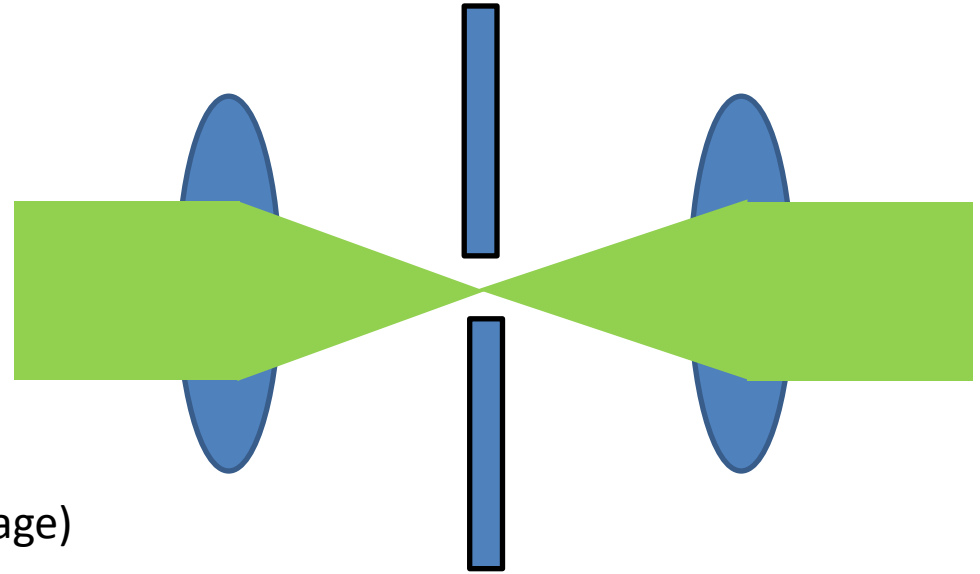
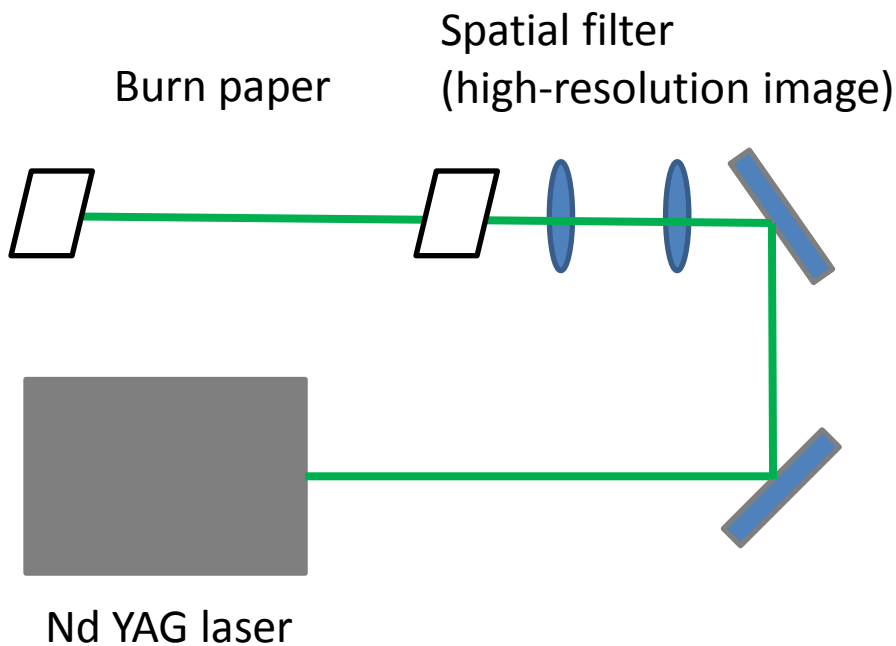


Set up of the spatial filter

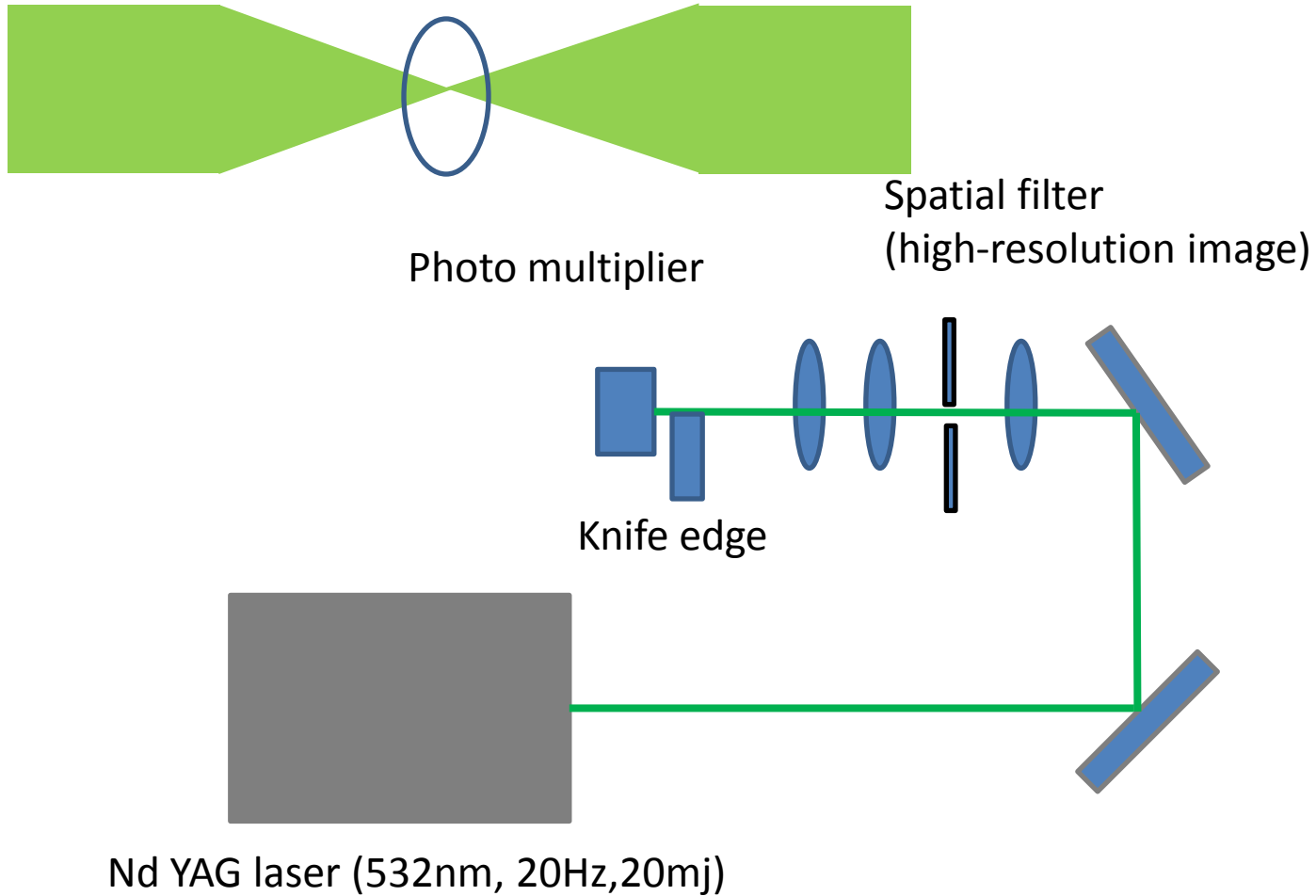


Set up of the spatial filter

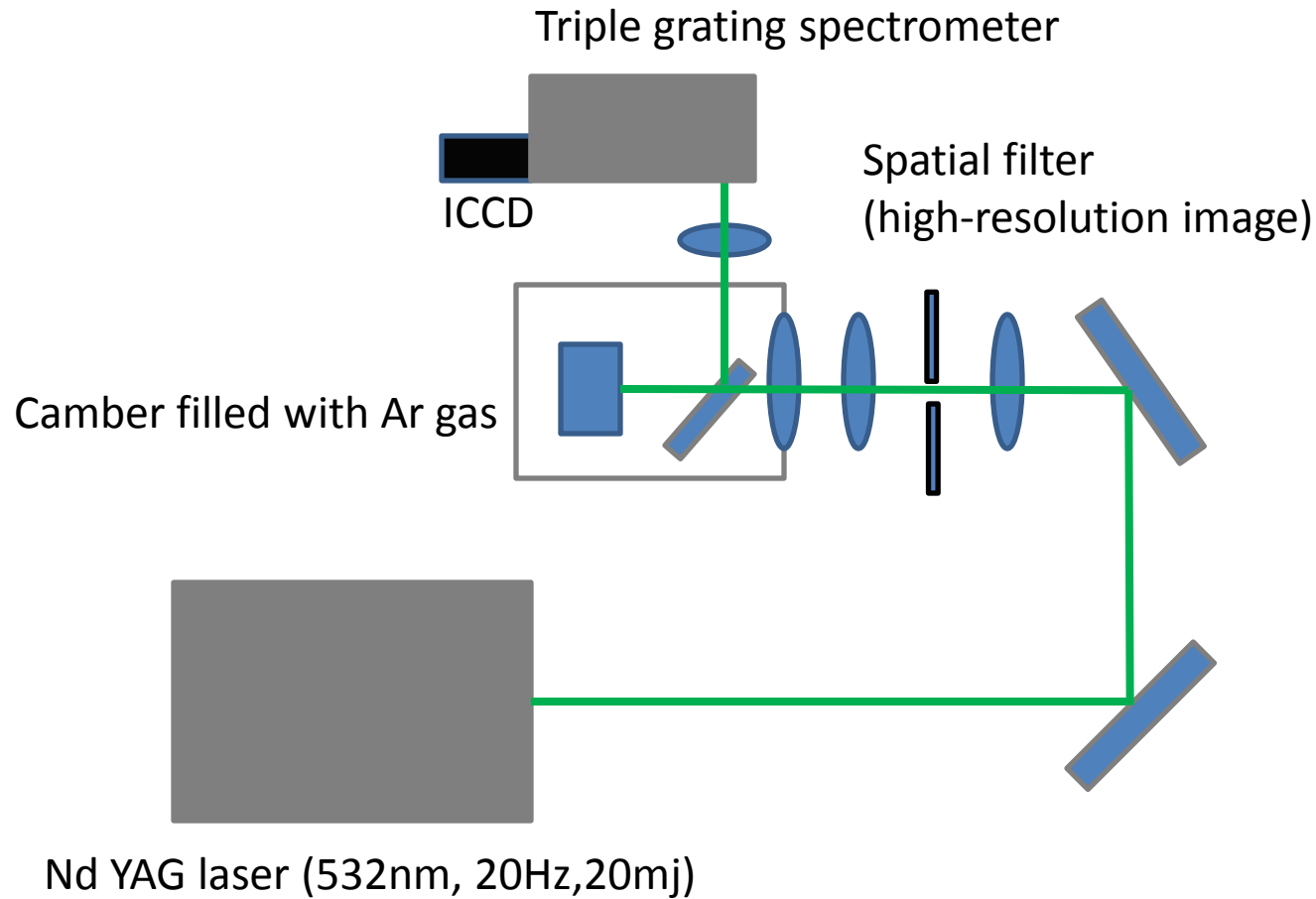
The image becomes clearly.



Beam profile



Set up of the Thomson scattering



Study Life

9:00-10:00

Arrive at school



11:30-12:30

Lunch & coffee time



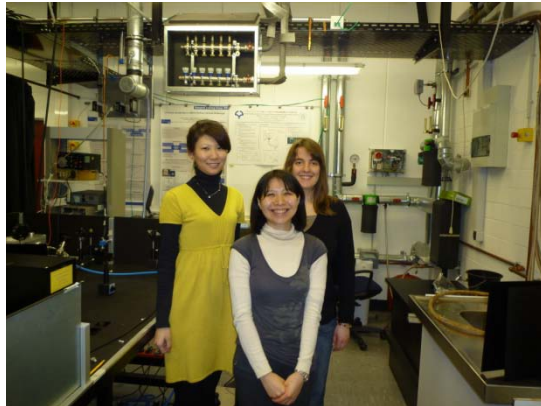
18:00-20:00

Go home

Good place to study plasma

Many professors come and make presentation.
Many researchers study there.

Meeting: every Tuesday, Lecture time: every Friday, Many Lecture



Bochum city



Succor team
VfL Bochum



Easy to get around

Düsseldorf: Japan city
Köln : Express station of EuroCity
Frankfurt: International Airport of Europe

Ruhr district

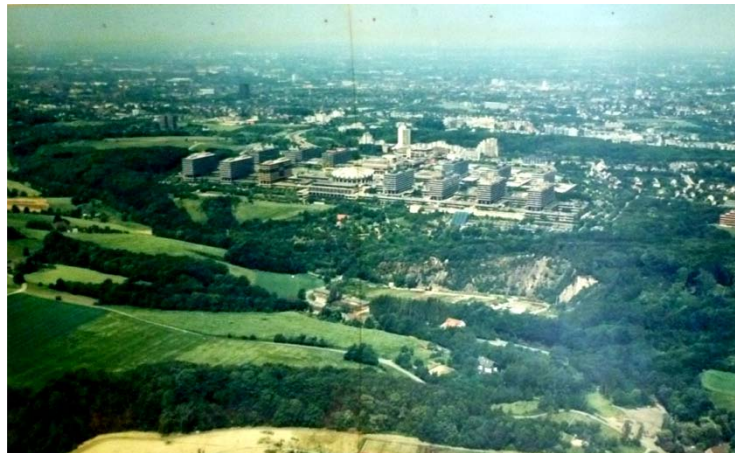


lower reach of Rhine river & Ruhr river

Ruhr-University Bochum



<Good connection>
Subway station and bus stop near the university.



Calm (good place in another season)



Buildings

Historical spot of Ruhr district

Mine museum (coal)



Essen



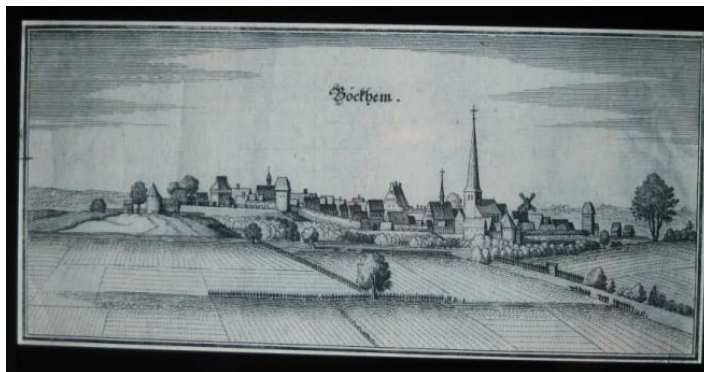
Bochum



Coal



Mammoth Bone



Old picture of Bochum city

In old days, there are huge coal mine
Under the ground.

<History> heavy industrial area
Mining: Coal, Ironstone
Smelting works of oil, Factory of beer

Summary

<Target>

- Making good Communication in English

→ I talked them everyday.

(But, I have to study English much more.)

- Earning knowledge of the plasma physics

→ I have learned many optical technique through the Thomson scattering.

→ They have many good lectures and I can learned more.

Thank you for your attention!

I really appreciate for Prof. Dr. Czarnetzki and Research Center for Plasma ITP Secretariat staff at Nagoya University.