

Single bunch operation, the generation of  
ultra-short light pulses at storagerings and their application

KEK,Japan

Feb 28-Mar 1, 2005

## Introduction of the time-resolved single-photon-counting VUV spectroscopy at NSRL

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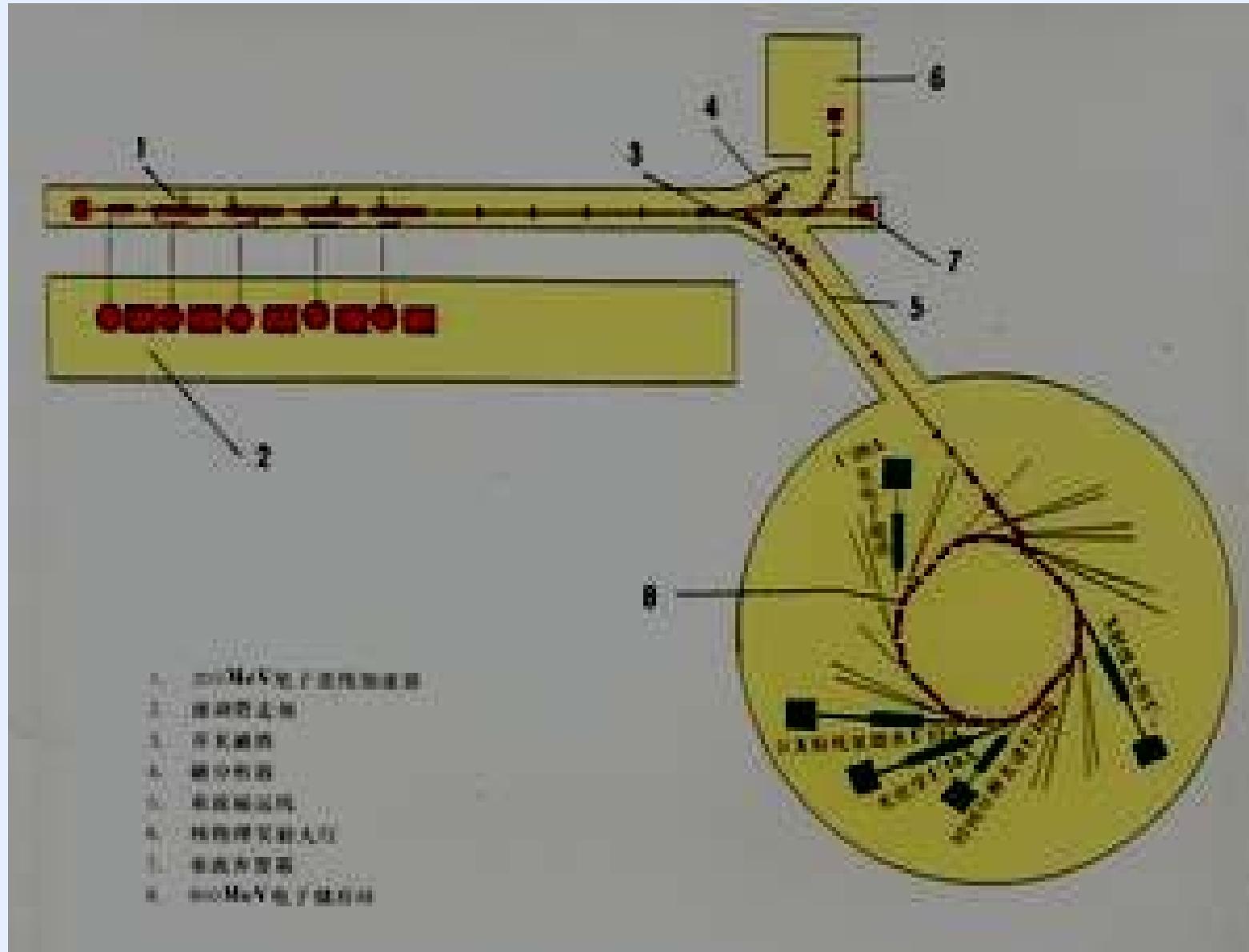
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University of Science and Technology of China  
Hefei, P. R. China*



# Introduction of NSRL

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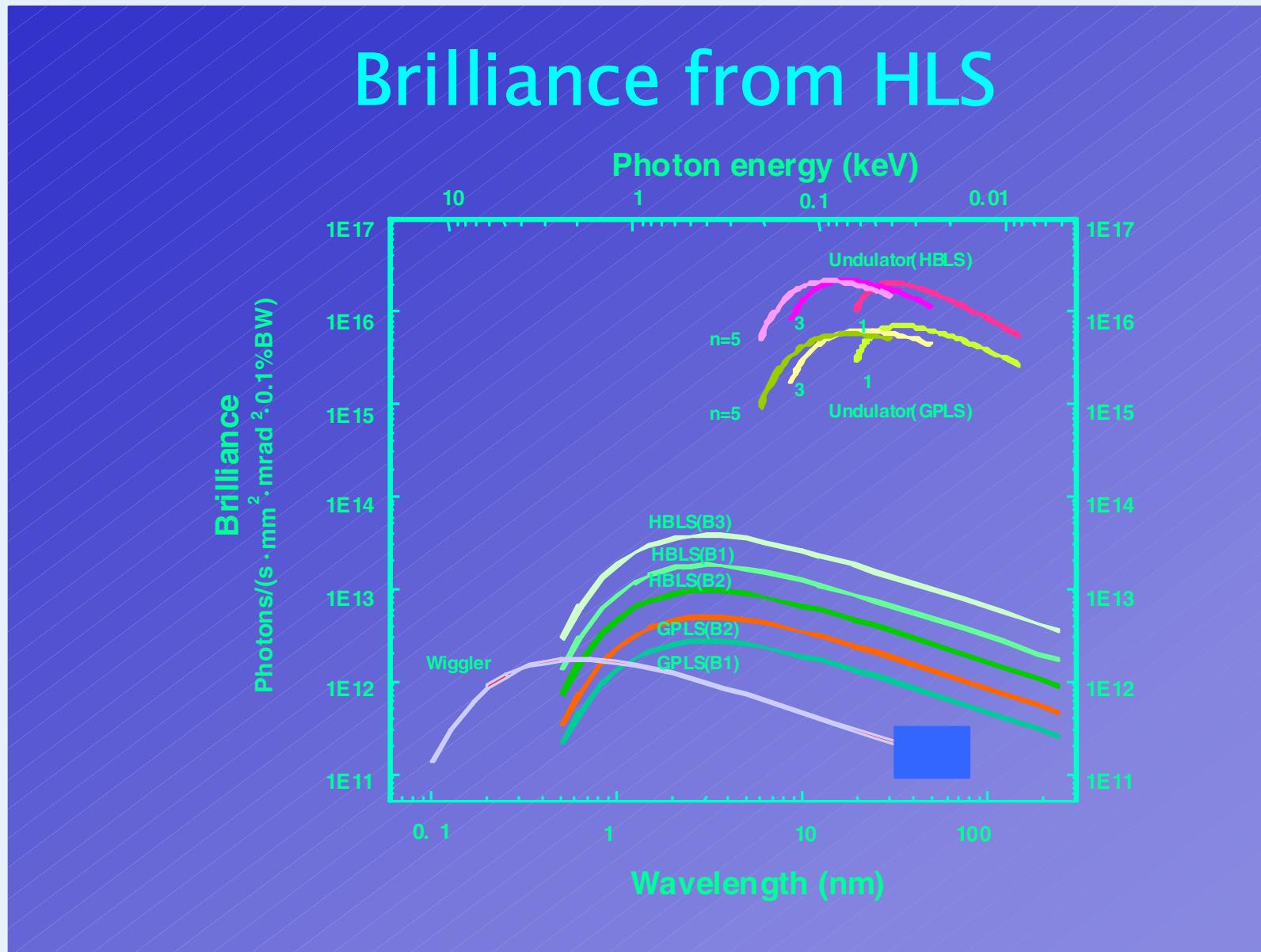
## Introduction of NSRL

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### Main parameters of HLS ring

• Electron Energy	E	800 MeV
• Beam Current	I	100-300 mA
• Bend Field	B	1.2 Tesla
• Curvature Radius	$\rho$	2.22 m
• Char. Wavelength	$\lambda_C$	24(4.8) Å
• Circumference	$L_C$	66.13 m
• RF Frequency	$f_{RF}$	204 MHz
• Harmonic Number	h	45
• Revolution Period	$T_C$	220 nS
• E-Loss /e <sup>-</sup> / turn	$U_o$	16.3 keV

## Introduction of NSRL

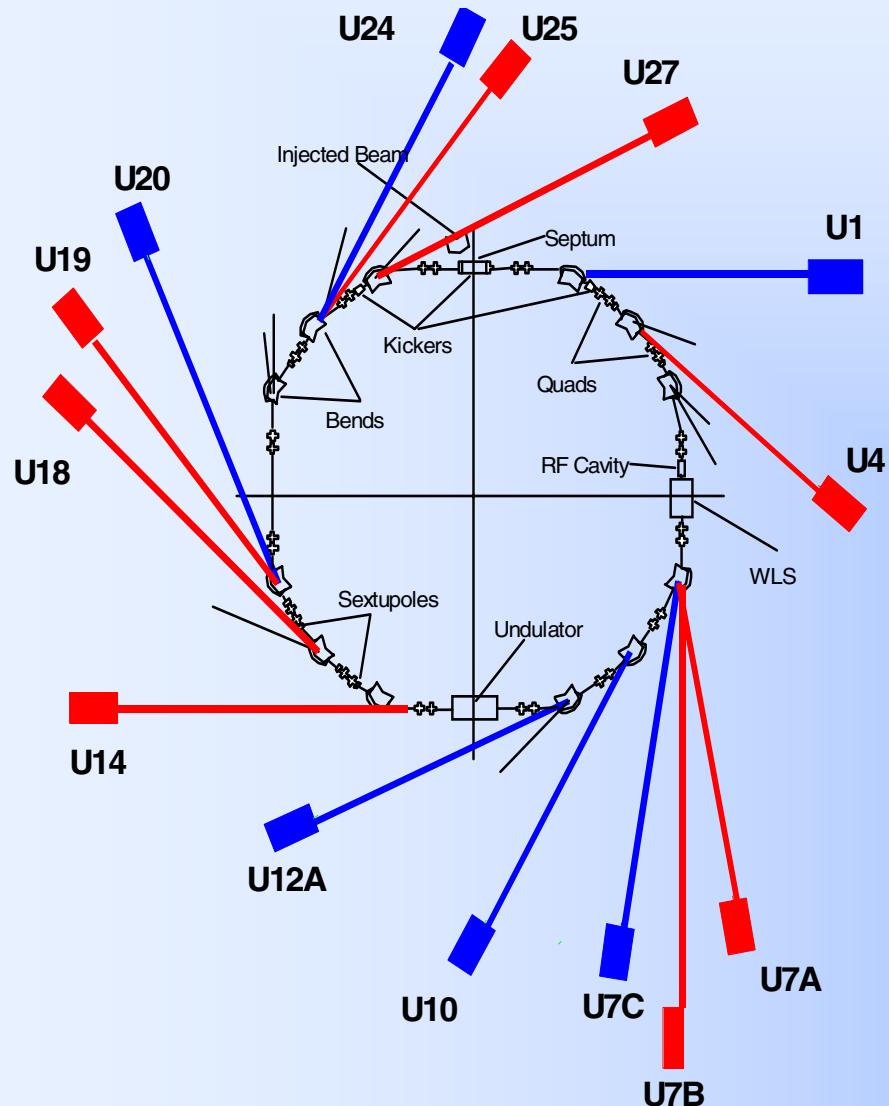


## Introduction of NSRL

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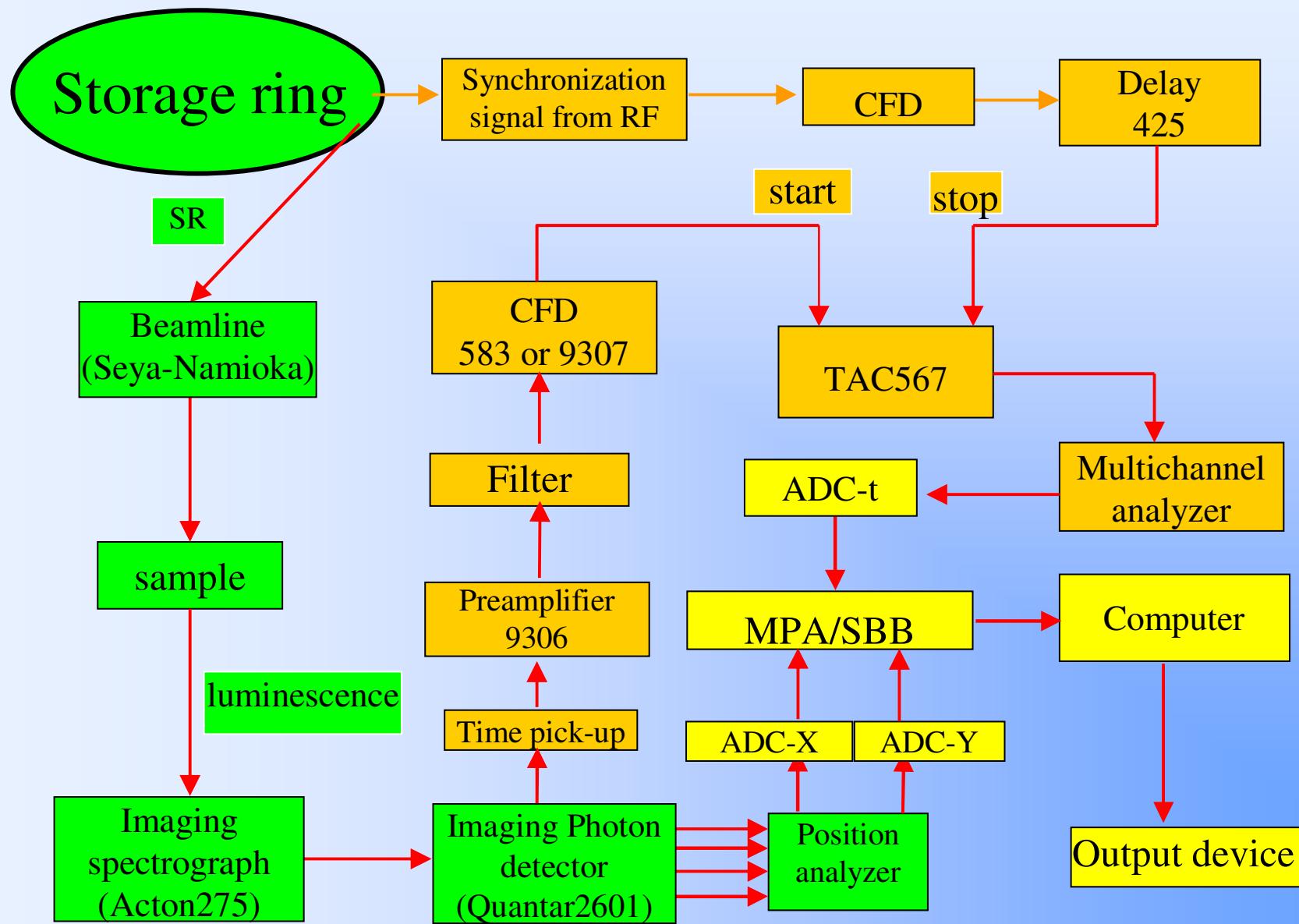


# Introduction of NSRL-beamlines and endstations



- U1** X-ray lithography
- U4** IR and Far IR Spectroscopy
- U7A** LIGA
- U7B** XAFS
- U7C** X-ray Diffraction and Scattering
- U10** Photo-Chemistry
- U12A** Soft X-ray Microscopy
- U14** Atomic and Molecular Spectroscopy
- U18** Soft X-ray MCD
- U19** Surface Physics
- U20** Photoelectron Spectroscopy
- U24** VUV Time-Resolved Spectroscopy
- U25** VUV Circular Dichroism Spectroscopy
- U27** Metrology and Spectral Radiation Standard

# Single photon counting system



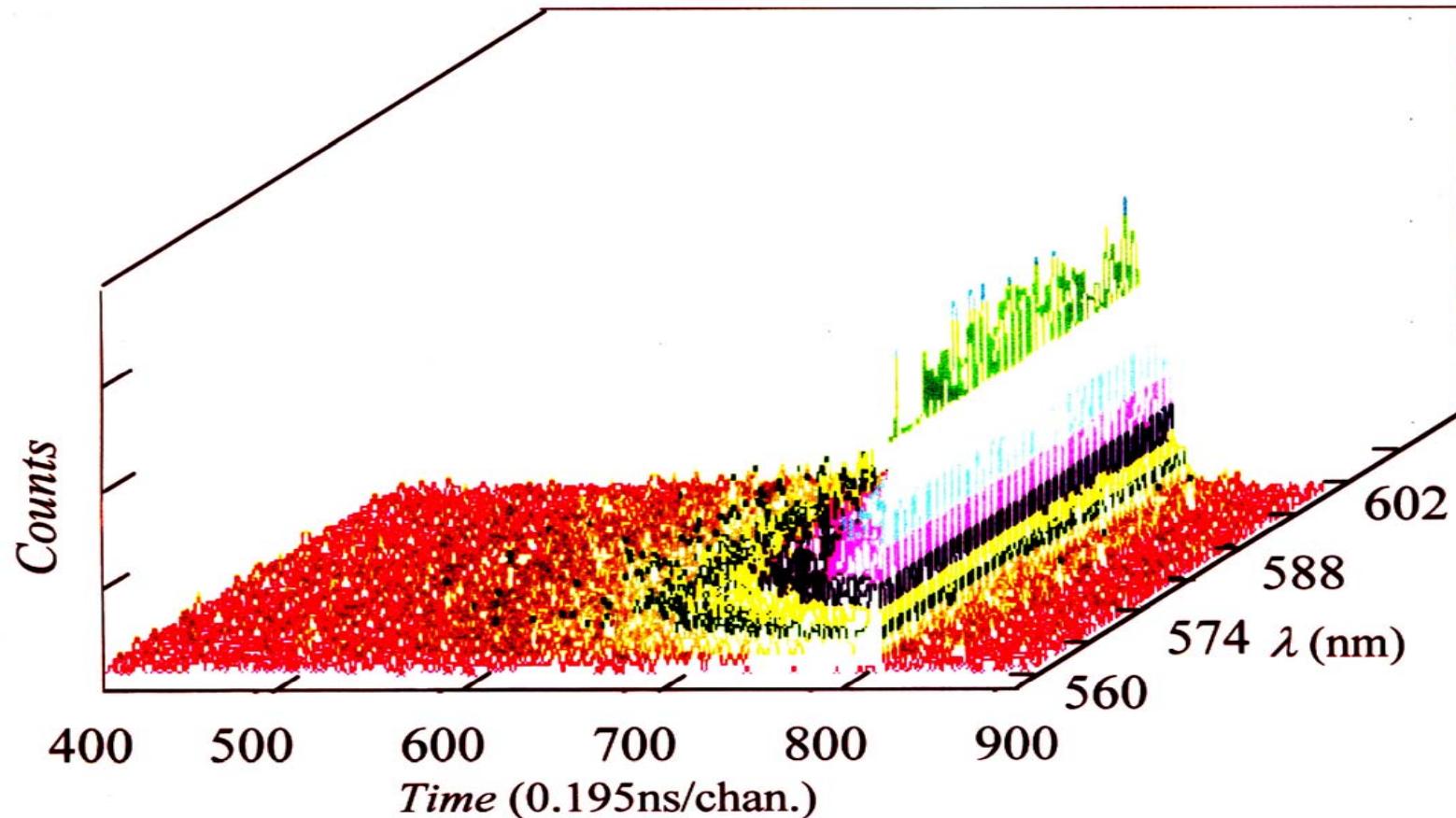
# Single photon counting system

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## Examples

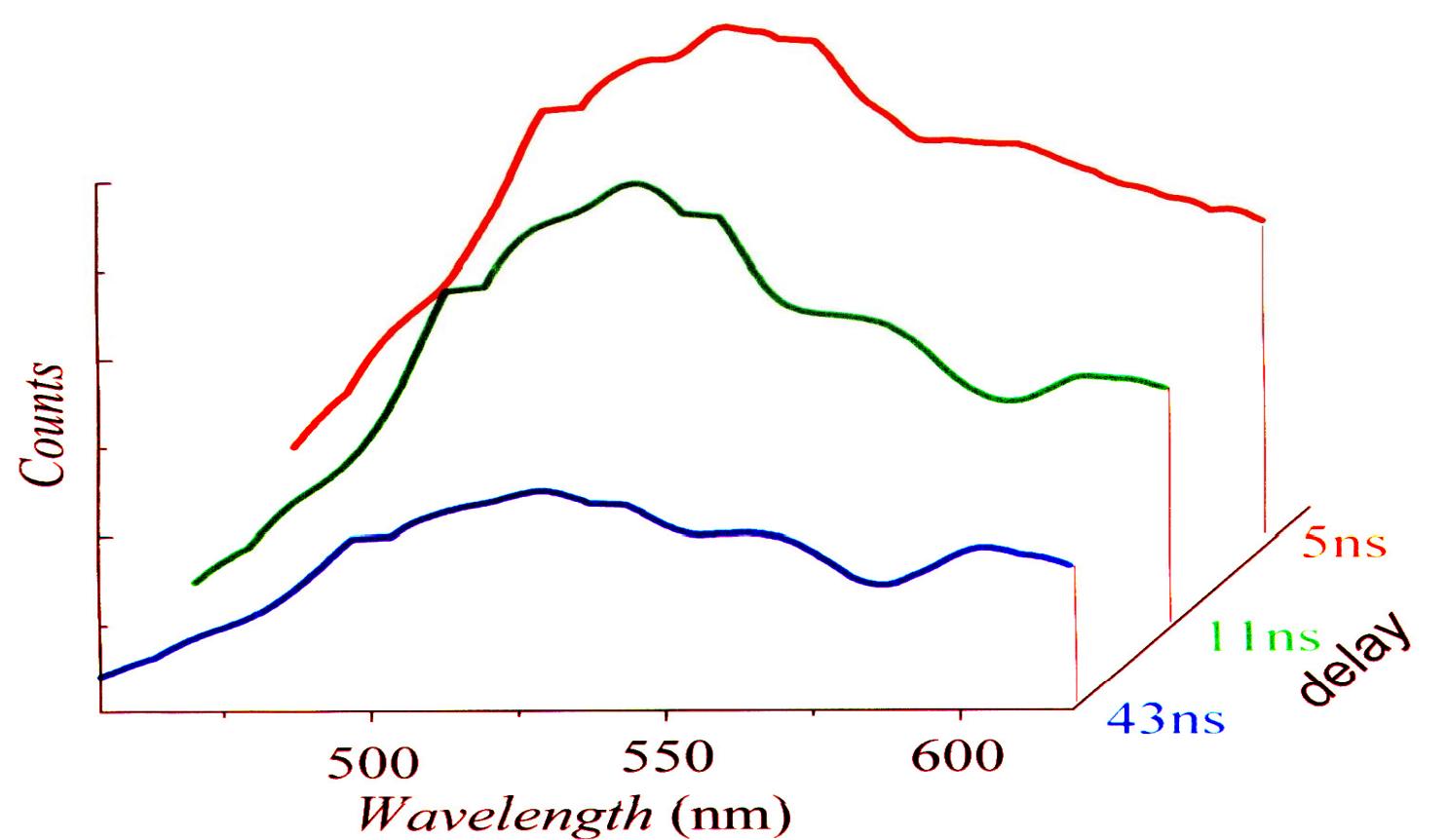
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The time-resolved spectroscopy of Rh-6G aqueous solution excited by 400nm photon

## Examples

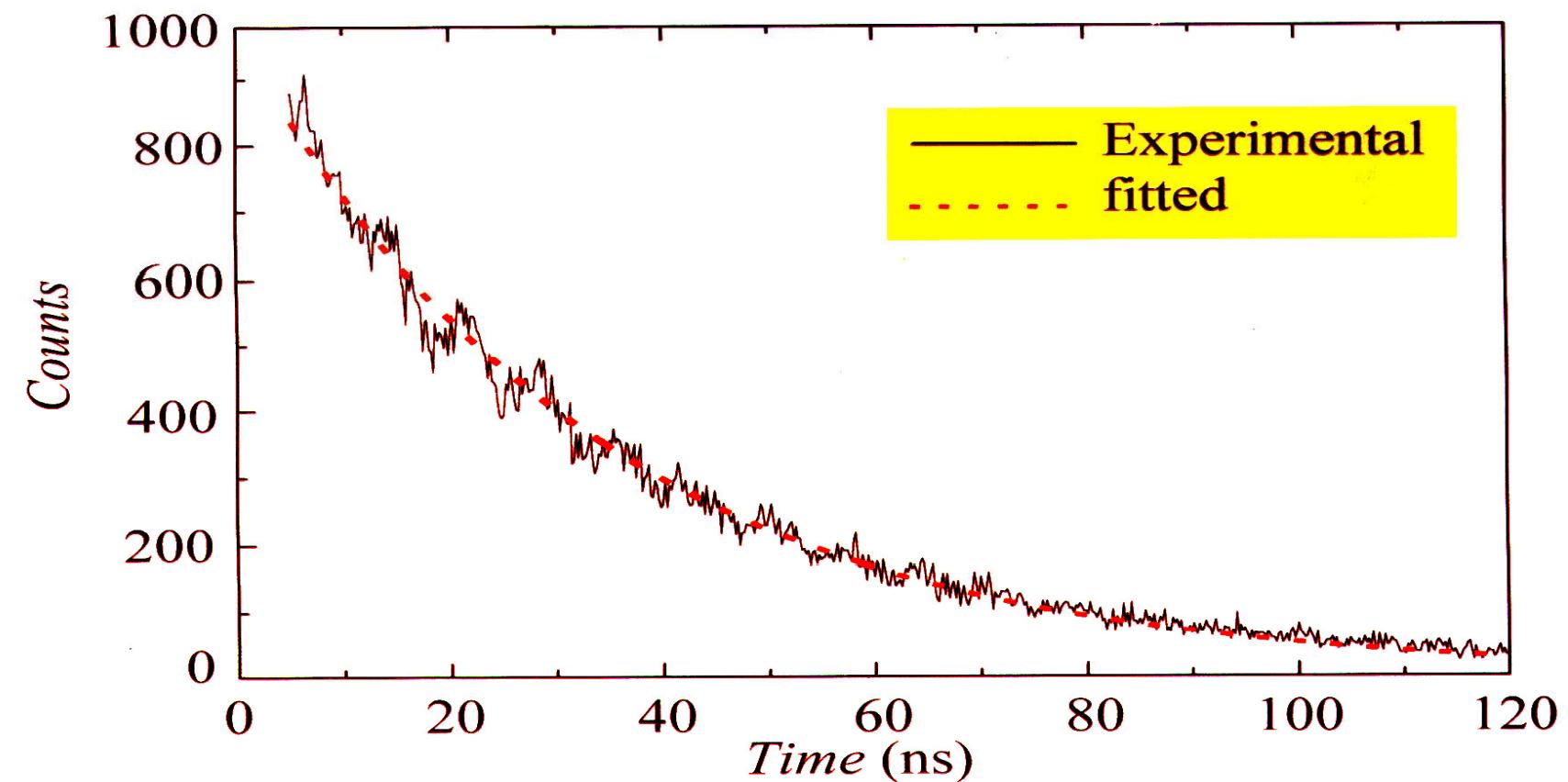
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The time-resolved spectroscopy of ALQ:Ce excited by 400nm photon.

## Examples

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The decay time of ALQ:Ce at 520nm emission  
excited by 400nm photon ( $\tau=33.9\text{ns}$ )



A wide-angle night photograph of a large industrial complex. In the foreground, a long, low-profile building with a light-colored, textured facade and several small windows is visible. Behind it, a larger, more modern building with a curved roof and numerous brightly lit windows stands prominently. Several tall, dark smokestacks rise from the buildings, emitting plumes of white smoke against the dark sky. The surrounding area is filled with various industrial structures, including smaller buildings and what appears to be a parking lot or storage yard. The overall scene is dimly lit by the artificial lights of the factory, creating a stark contrast with the dark night sky.

Thank You !

## VUV beamline(Seya-Namioka)

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**Wavelength range:**

**40-350nm**

**Resolve power:**

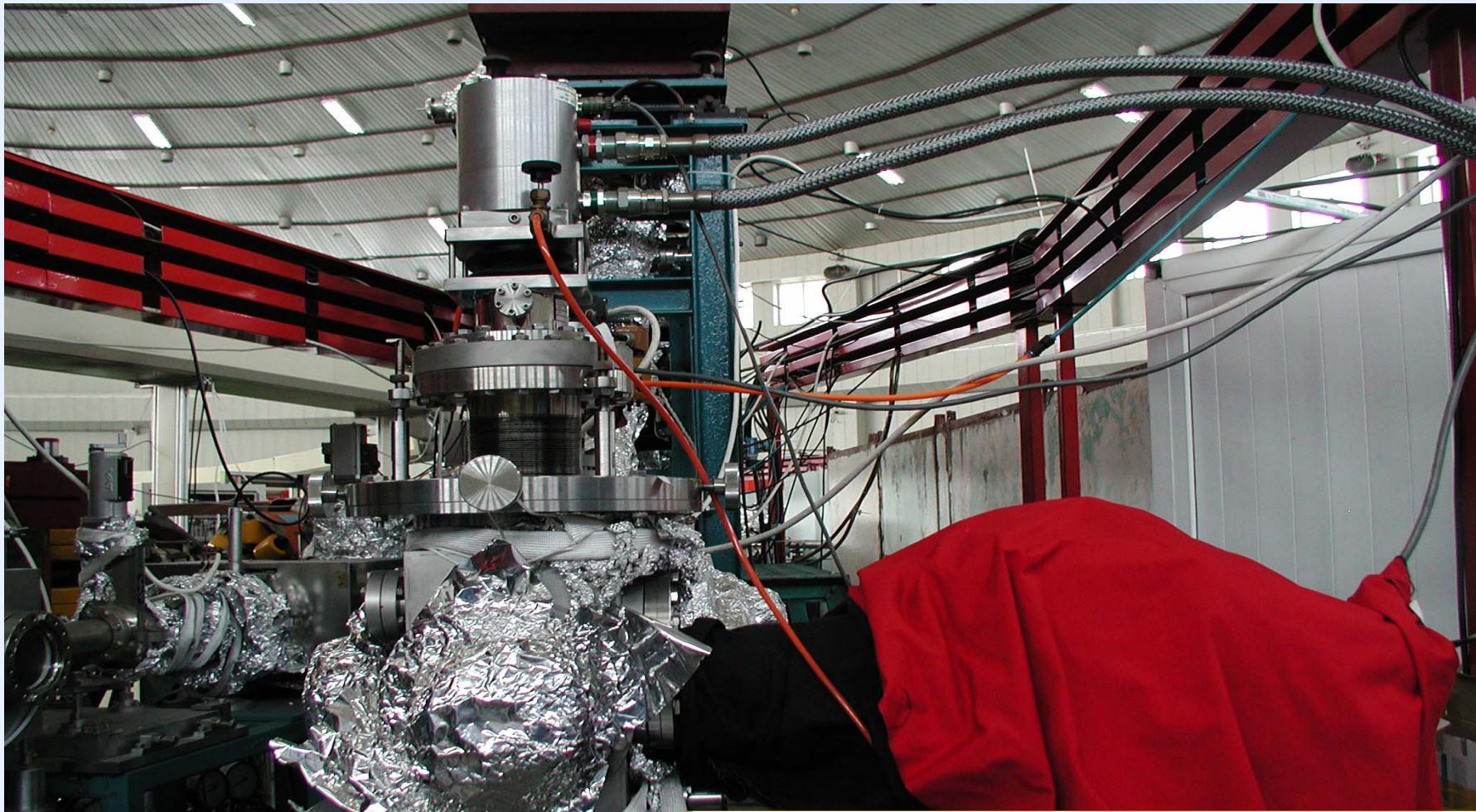
**>500**

**Flux at sample:**

**$10^{10}$  ph/s ( $I=200mA$ )**

## VUV Endstation

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# **Specifications of the Imaging Spectrograph**

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## **Optical System:**

Czerny-Turner type

## **Focal Length:**

275mm

## **Resolution:**

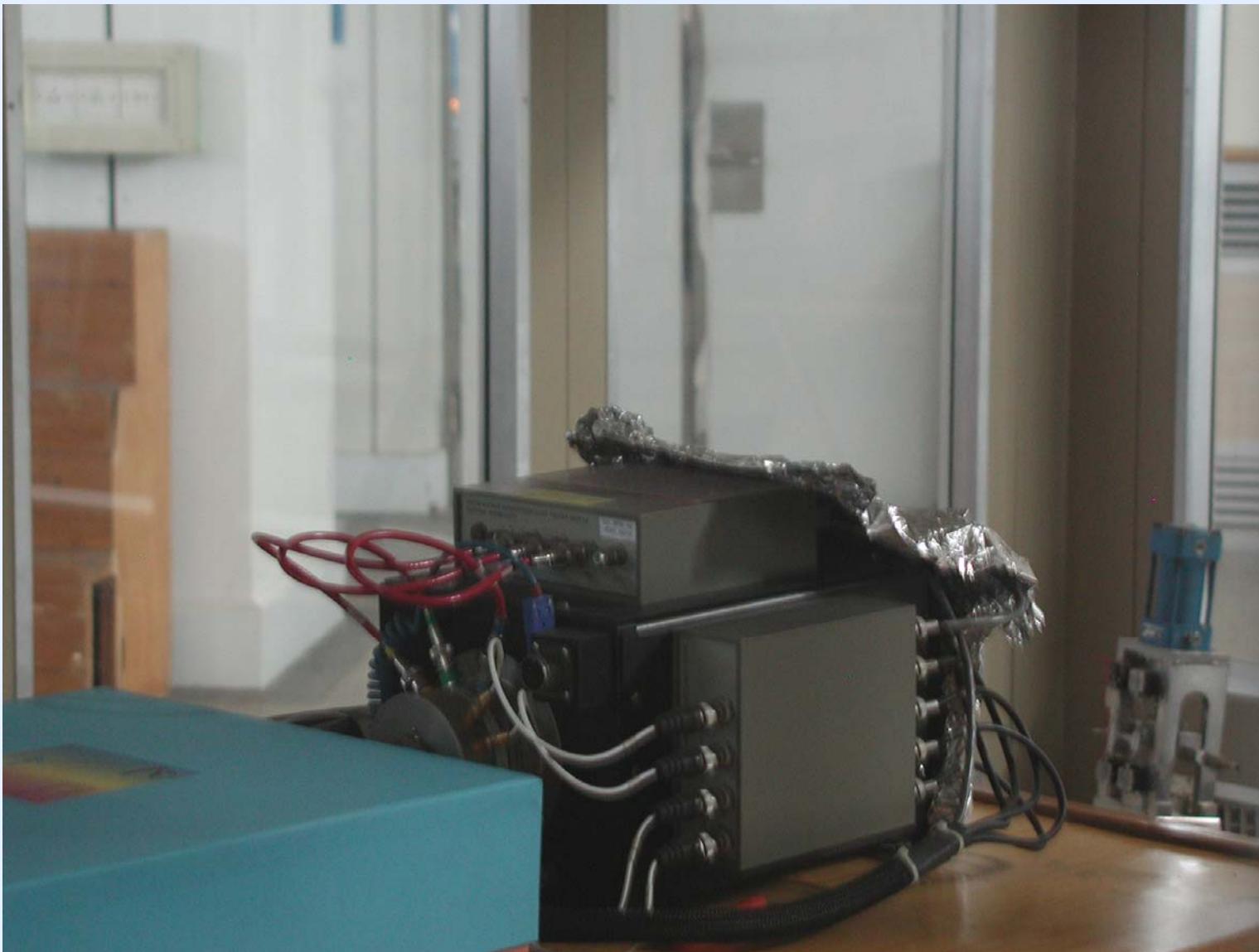
0.1nm with standard 1200g/mm grating, 10 $\mu$ m slit

## **Focal plane detector compatibility:**

provides nominal 592nm coverage with 150g/mm grating,  
293nm with 300g/mm grating, 143nm with 600g/mm grating,  
and 67nm with 1200g/mm grating at 500nm

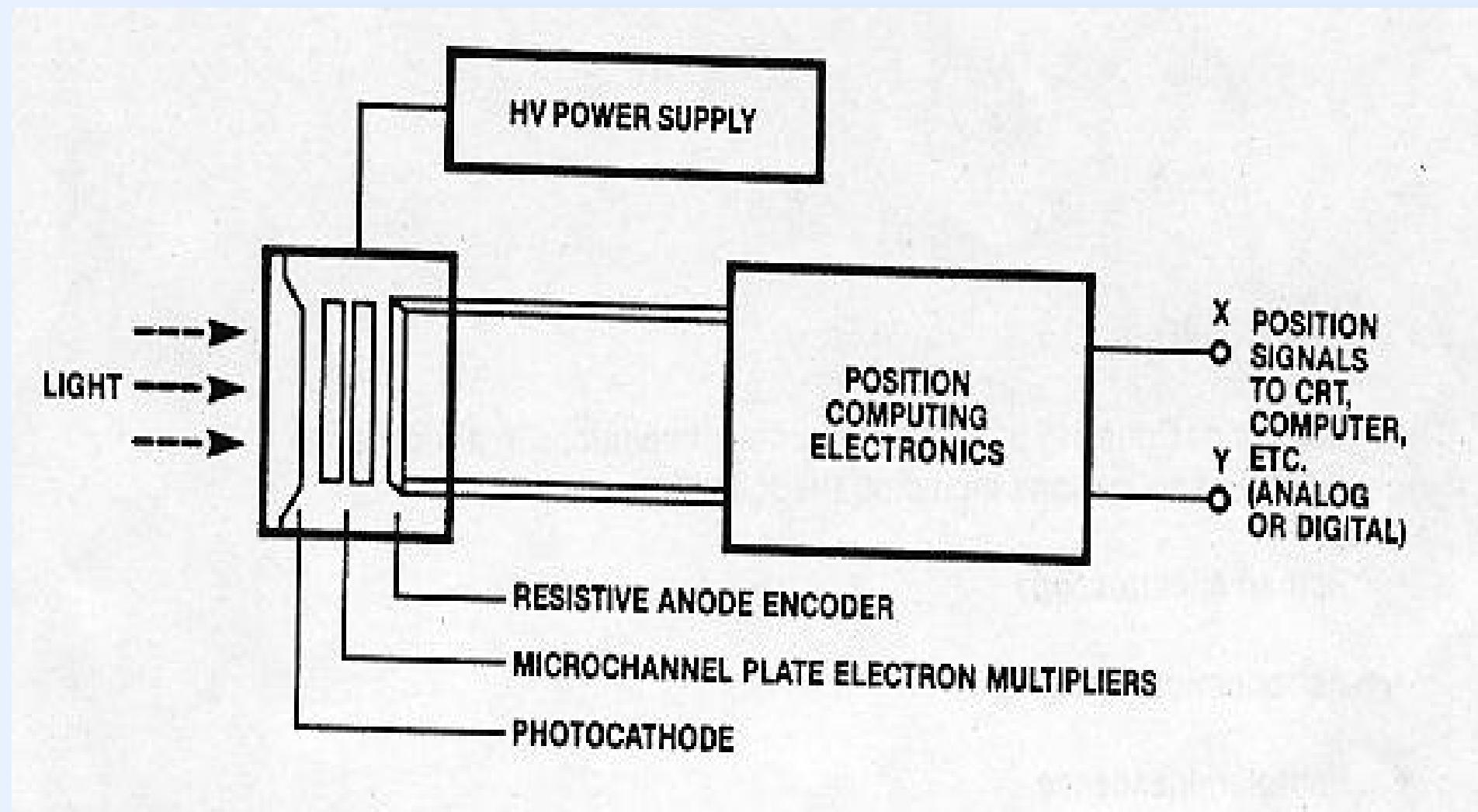
## 2D Imaging detector-MCP/RAE

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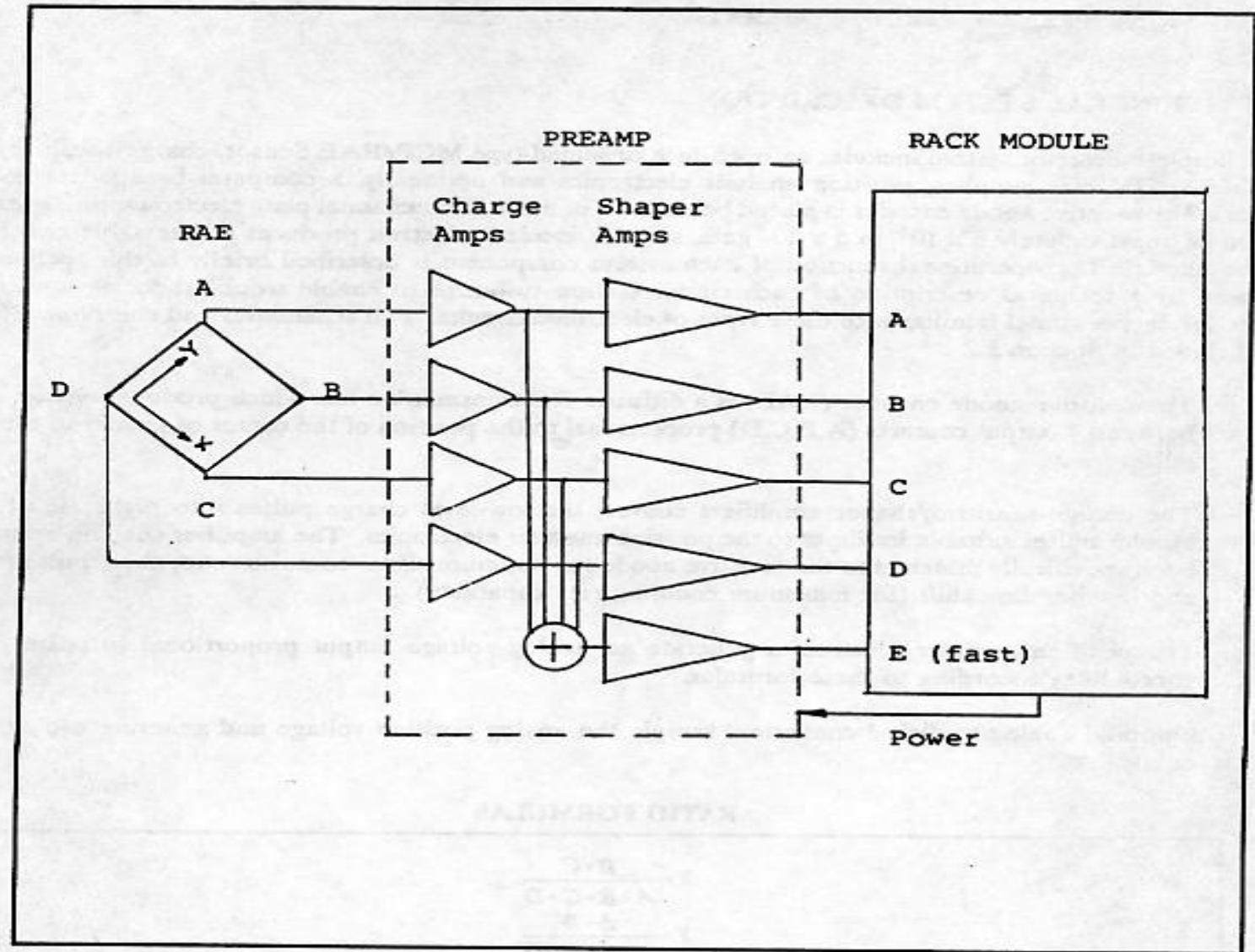


## 2D Imaging detector-MCP/RAE

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# Functional Diagram



# Position Analyzer



# TAC



## Single bunch operation

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