

# SFET Optics Contamination Status

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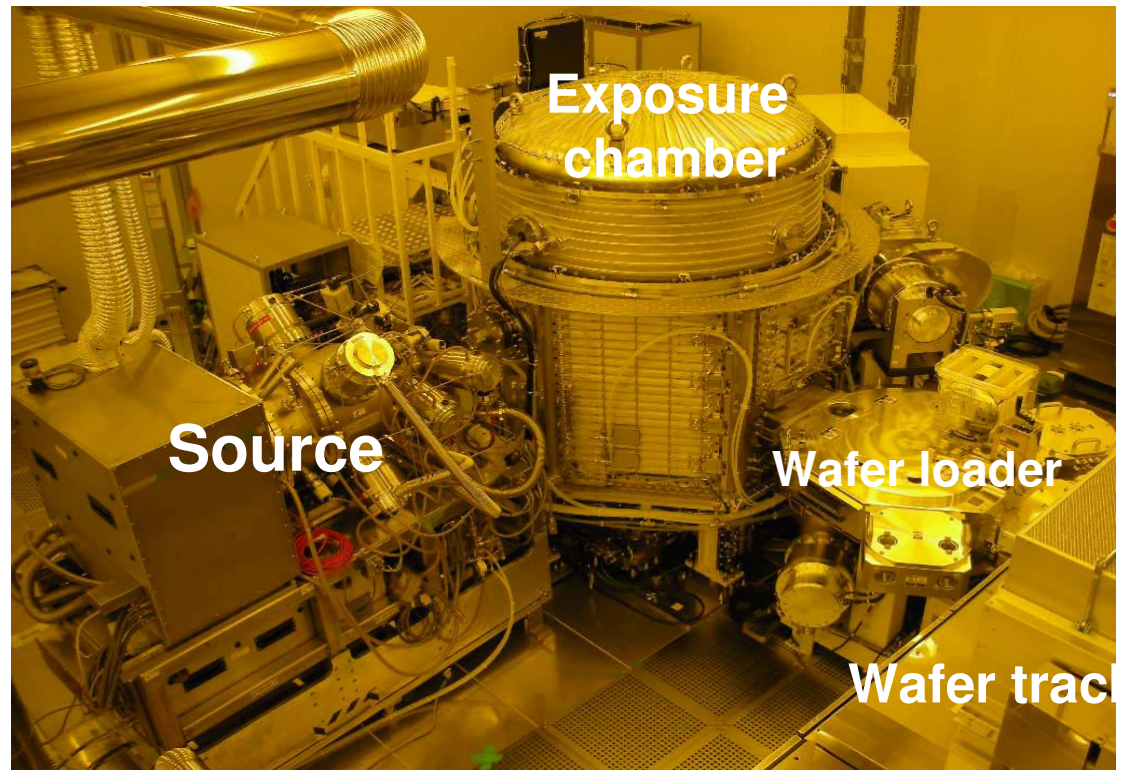
**This work was supported by NEDO**

Nov. 1, 2007

## Purposes

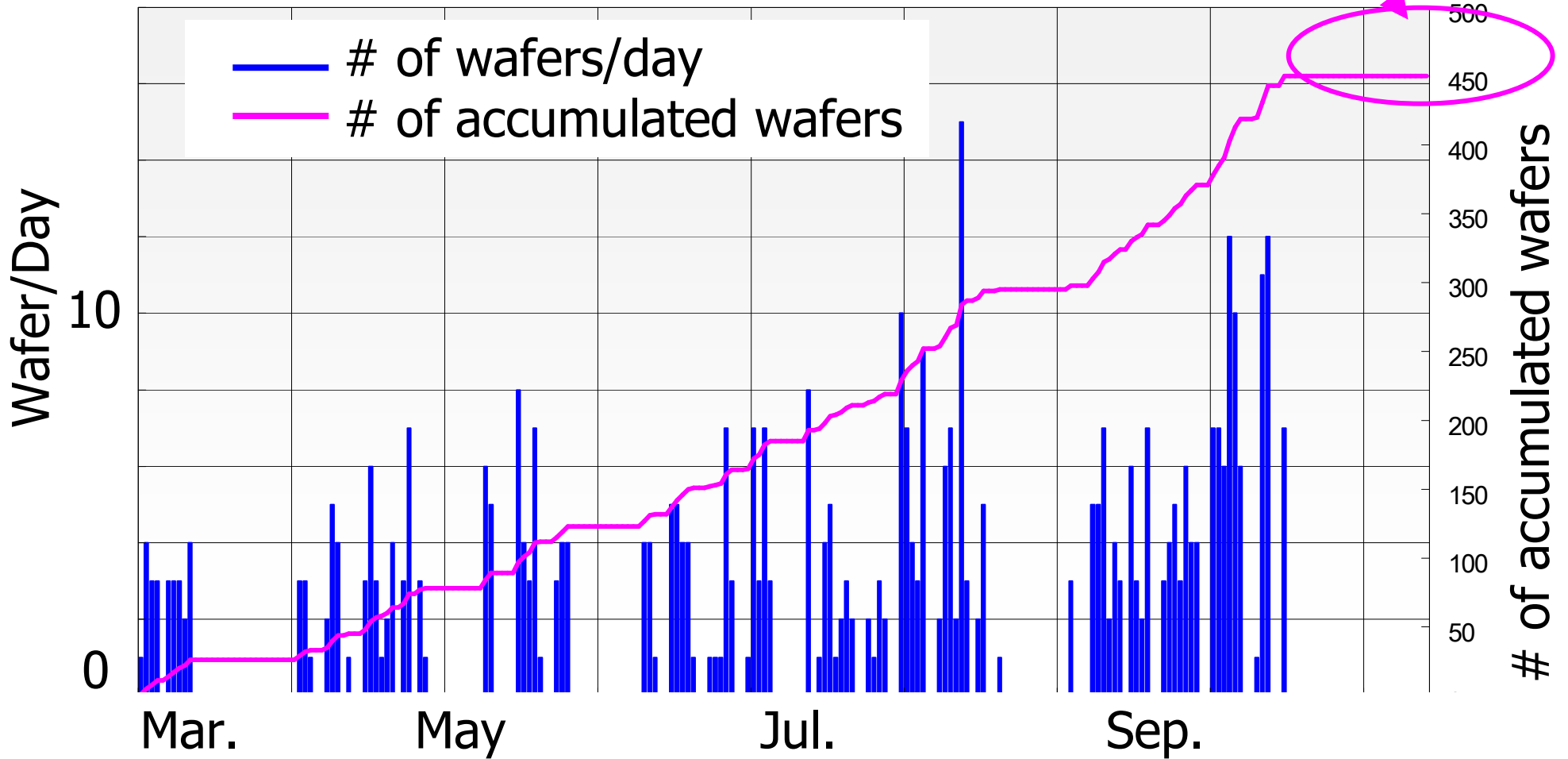
- ◆ Optimize mask structure
- ◆ Develop resist materials
- ◆ Evaluate optics & source lifetime

Items	Specification
NA	0.3
Field size	0.2 x 0.6 mm
Magnification	1/5
Wafer size	300mm



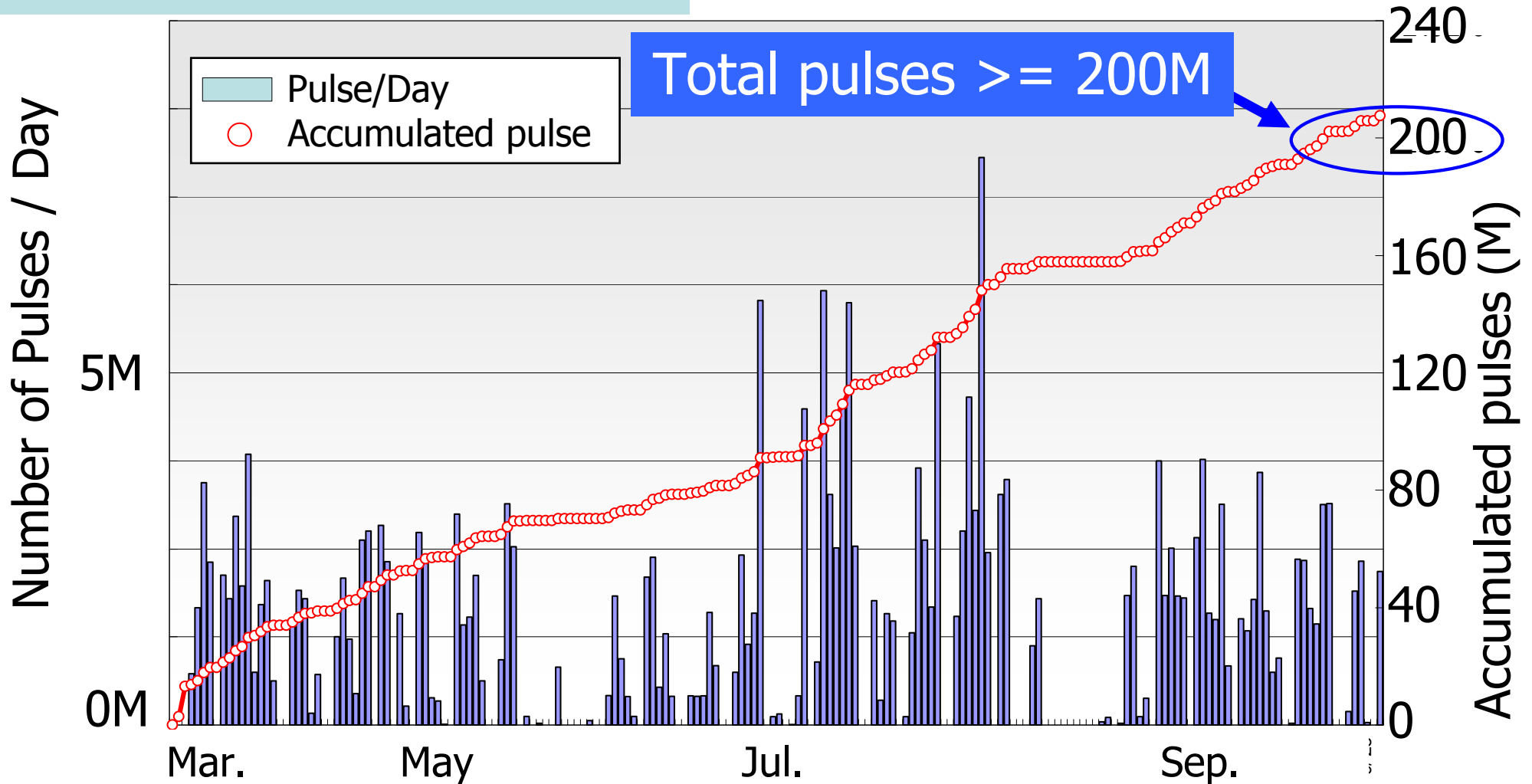
## Number of Wafers

Total wafers = 450



→ Utilization rate is high and stable.

## Number of Source Pulses

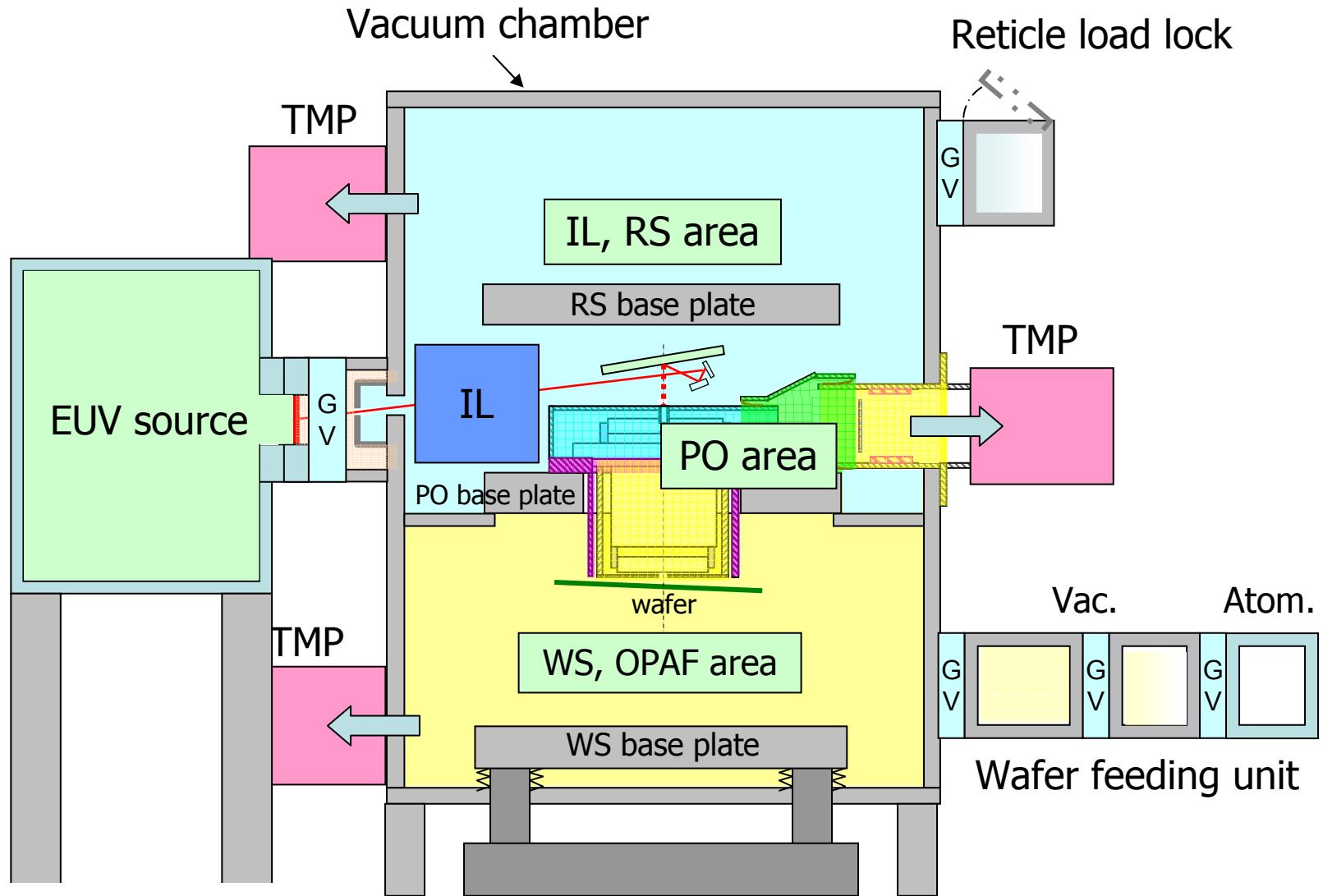


# 1 ( 7 0 M p )

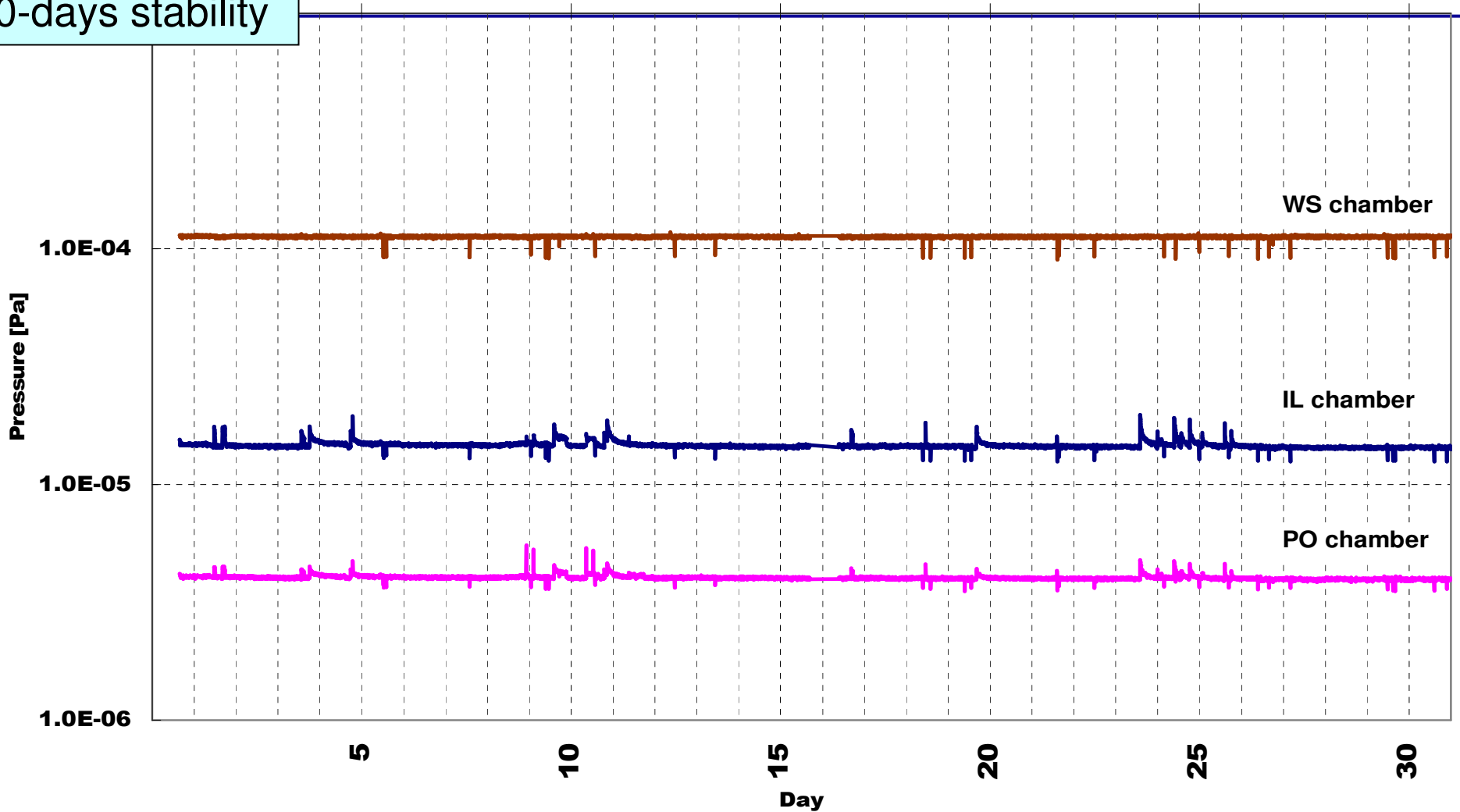
# 2 ( 8 5 M p )

# 3

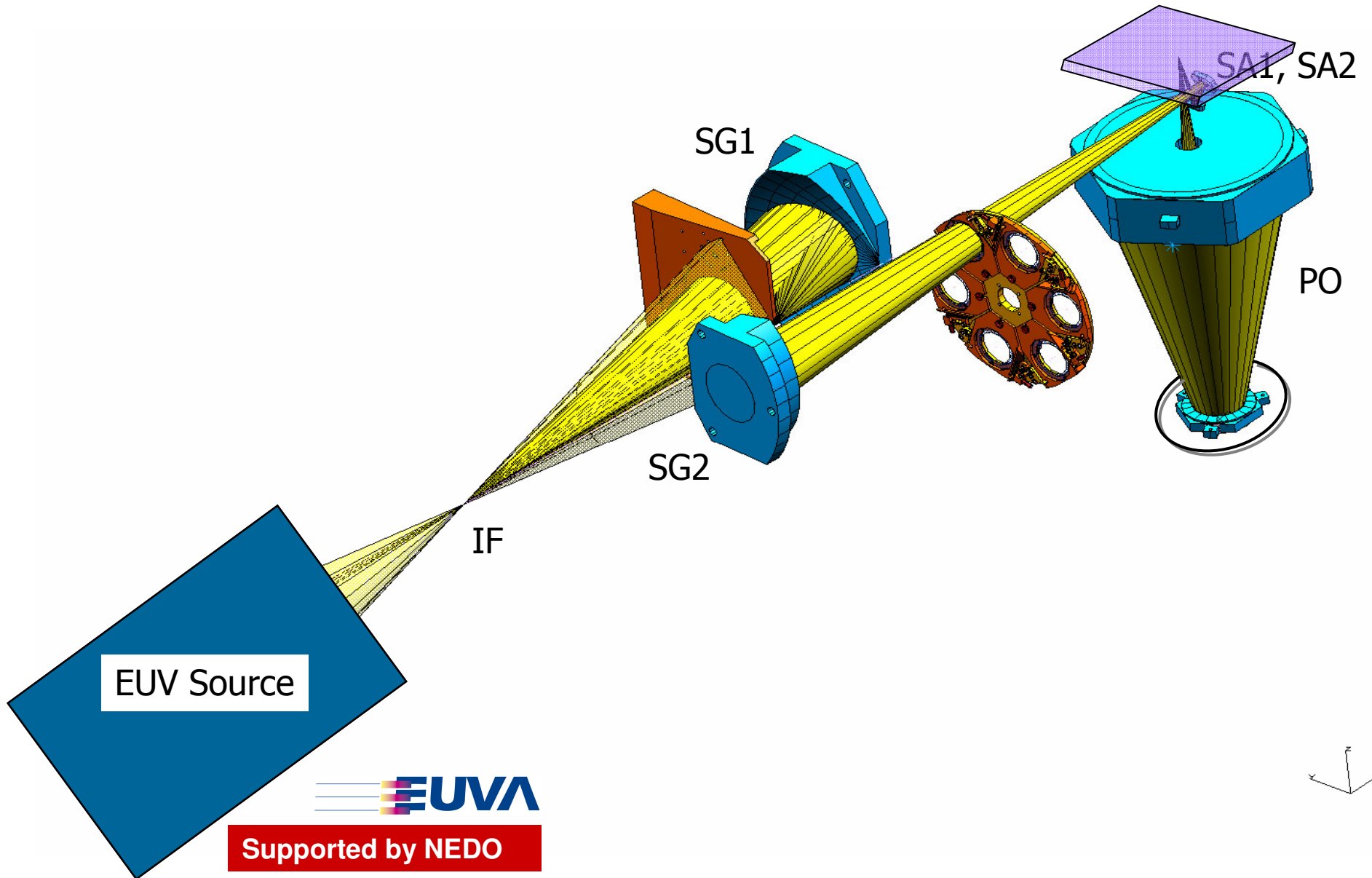
# 4



30-days stability



Chamber pressure is well keeping during tool running  
eventhough wafer & mask in/out .



2006

Site: Canon) Utsunomiya.

Source: LPP (Xe)

Illuminator: Critical type

In 2006, we Selete, EUVA and Canon decided to change the source from LPP-type to DPP-type to make the exposure field larger.

2007

Site: Selete) Tsukuba, Installed on March, 2007.

Source: DPP (Xe)

Illuminator: Critical type

## ◆ Illumination:

- Improvement of Light intensity in a field
- Critical illumination → Koehler illumination ~ Dec.,2007

## ◆ IF Alignment tool:

- Improvement of Maintenance
- It makes it easy to align the optical axis ~ Dec.,2007

## ◆ Others:

- Contamination check of a reflective mirror in front of the critical illuminator.
- Bug fix of SFET software
- ON/OFF tool of SPF ~ Dec.,2007
  - Investigation of Out of Band effects

# Our Plan of SFET improvement in near future

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## ◆ Illumination:

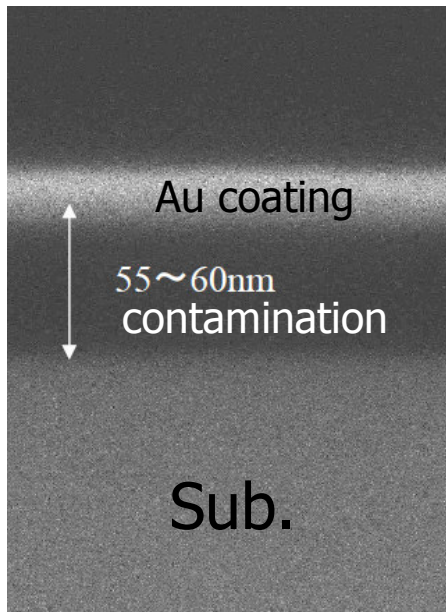
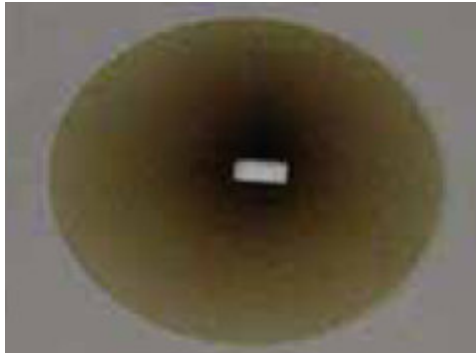
- Improvement of Light intensity in a field
- Critical illumination → Koehler illumination

## ◆ IF Alignment tool:

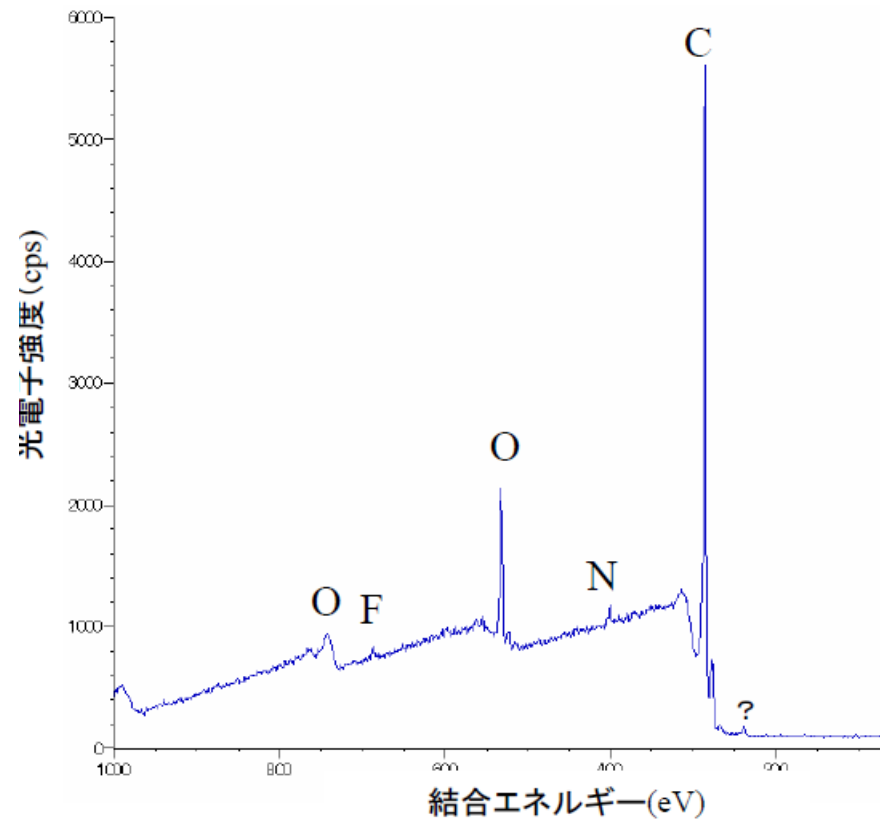
- Improvement of Maintenance
- It makes it easy to align the optical axis

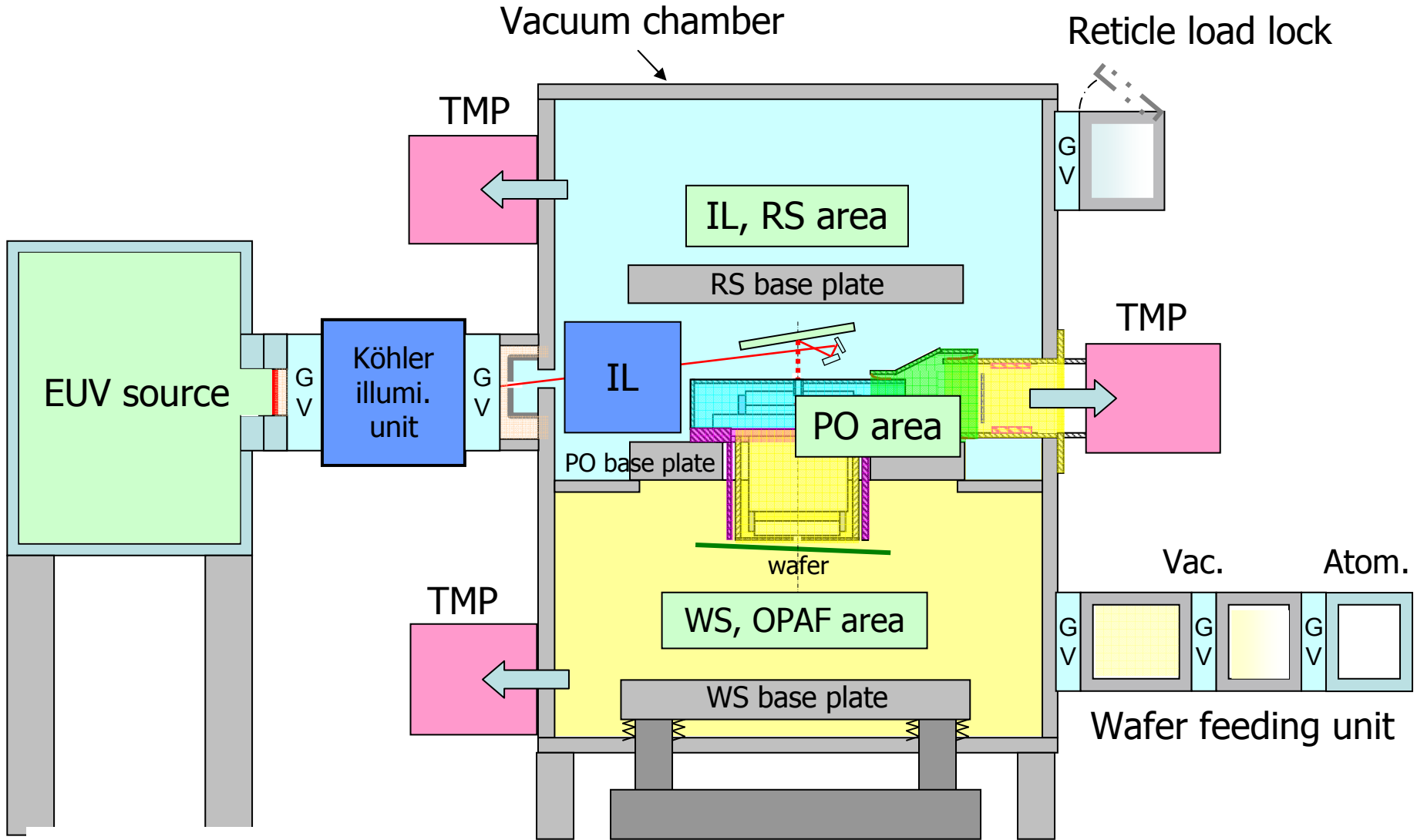
## ◆ Others:

- Contamination check of reflective mirrors of illumination optics.
- Investigation of Out of Band effects



## XPS



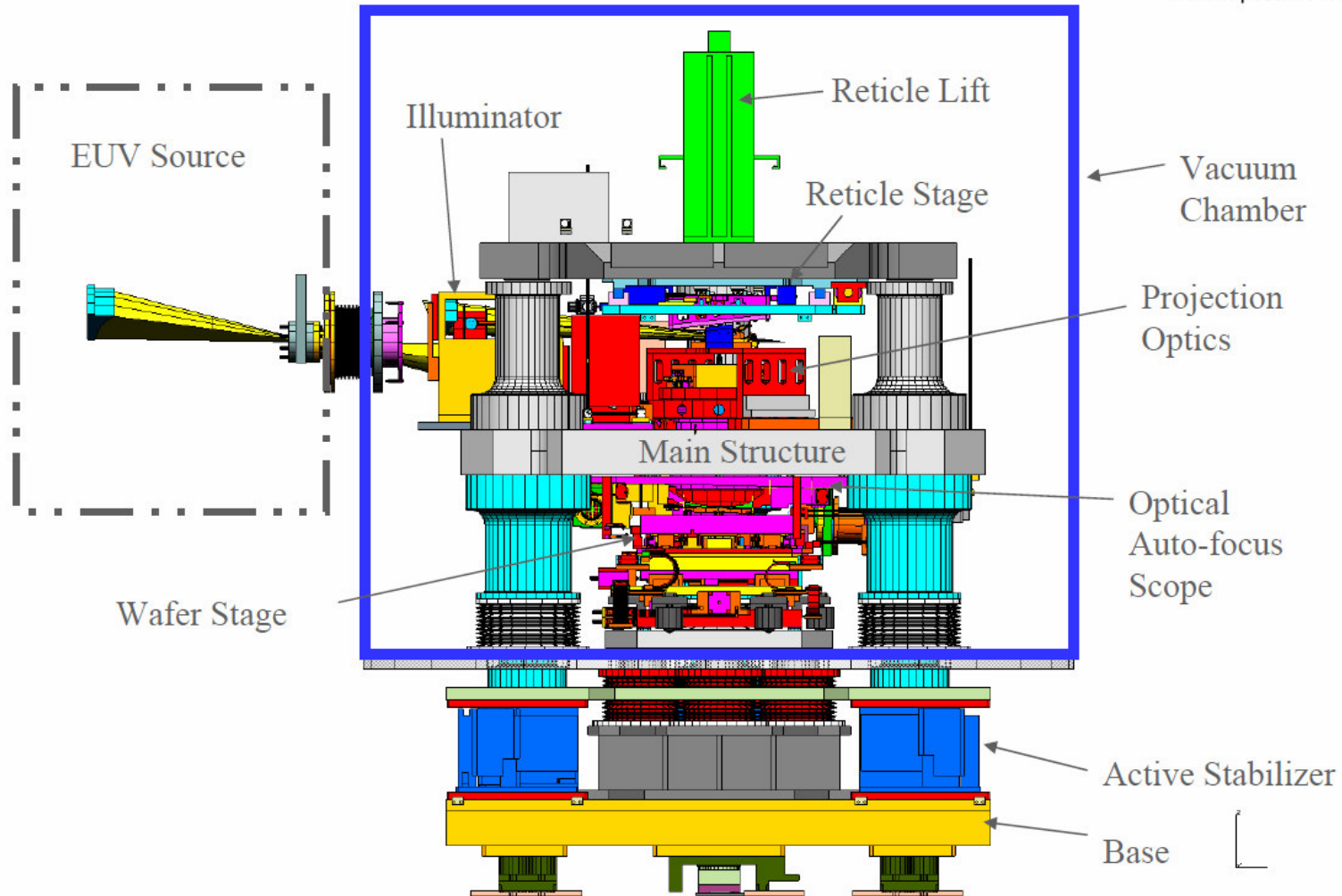


- We exposed 450 wafers (200 M pulses, source) after shipped to Selete site on March, 2007.
- We have no chance to measure the reflectivity loss of illumination optics. At least, no significant damage causing the throughput loss has not been observed.
- We have used SFET in critical illumination system. We have a plan to change it to Koehler illumination one, near future (Dec., 2007). We will be able to observe directly the mirror degradation of illumination optics

**This work was supported by New Energy and Industrial Technology Development Organization (NEDO).**

**Canon**

make it possible with canon



4<sup>th</sup> EUVL Symposium Nov.2005

Schematic diagram of SFET vacuum system

