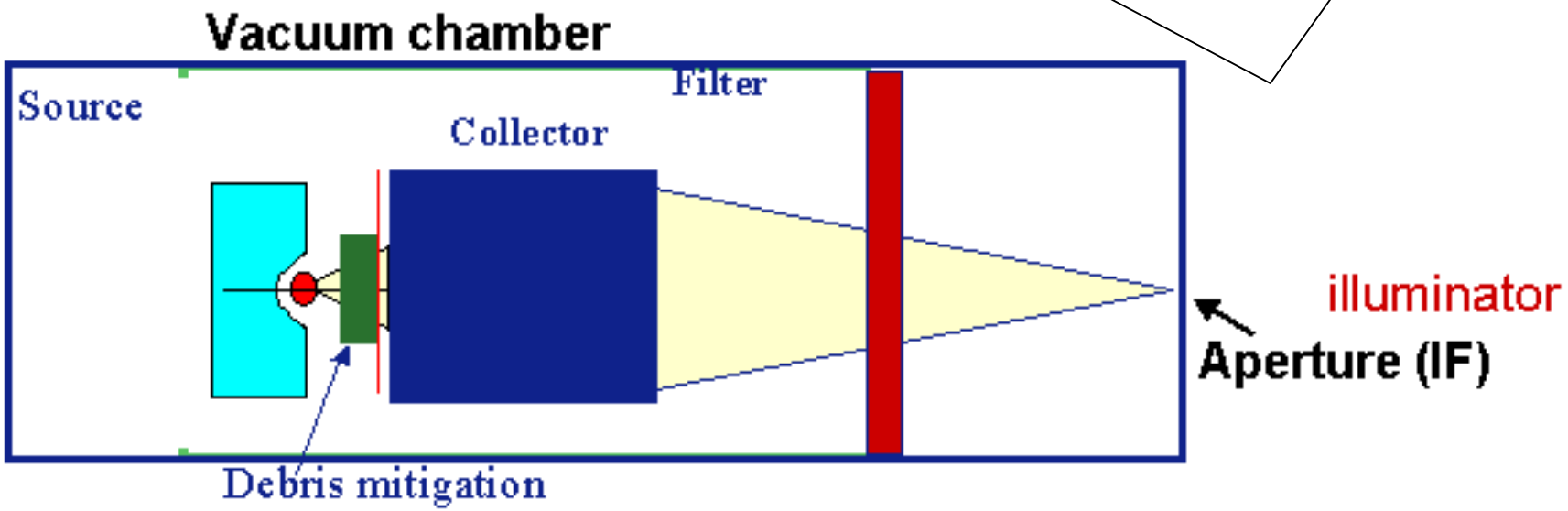
Joint spec

ASML, Canon, Nikon

Definition of clean photon spot at intermediate focus (IF)

Source specifications are defined at intermediate focus (IF) which is illuminator entrance



Joint Requirements for EUV Source

SOURCE CHARACTERISTIC	REQUIREMENT	Oct-02
•Wavelength	13.5 [nm]	
•EUV Power (in-band)	115 [W] (note: this is after intermidiate focus)	80-120
•Repetition Frequency	> 10-7 kHz ***	> 6
•Integrated Energy Stability	±0.3%, 3σ over 50 pulses	
•Source Cleanliness	≥ 30,000 hours (note: this is after intermediate focus)	
•Etendue of Source Output	max 1 - 3.3 mm^2sr ***	
•Max. solid angle input to illuminator	0.03 - 0.2 [sr] (depending on particular optical scheme)***	
•Spectral Purity:		
130-400 [nm] (DUV/UV)	≤ TBD - 7% (Design dependent)***	
• ≥ 400 [nm] (IRVis) at Wafer	TBD	

***** Not agreed among participants**

ASML

assure success

Typical Throughput Model

Throughput	[wfr/hr]	**100**
Time per item		
total time wfr	[sec]	36.0
Stage overhead	[sec]	27.0
exposure time	[sec]	9.0
Field-wafer parameters		
wafer diameter	[mm]	300
% wfr exposed	%	78.7%
penalty for not using full field height	%	96.2%
Resist sensitivity	[mJ/cm^2]	5.0
Intermidiate derivatives at wafer		
total energy/wfr	[J]	2.9
power at wfr	[Watt]	0.321
PO-box		
reflectivity mirror	[%]	67.5%
nb near normal mirrors		6
bandwidth mismatch loss	[%]	5.0%
polarization loss	[%]	5.0%
gas absorption PO	[%]	5.0%
Total transmission PO		8.1%
Reticle		
reflectivity reticle	[%]	65.0%
power at reticle	[Watt]	6.1
Illuminator		
total transmission Ill		8.4%
General		
overall component degradation		37.0%
Power captured clean inband photons	[W]	**115.2**

Summary

- *Joint specs updated.*
  - *Minimum required power has increased as target throughput was raised.*
    - *80 W @ 80 WPH to 115 W @ >100 WPH*
  - *Repetition frequency has increased.*
    - *> 6 kHz to 10 - 7 kHz*
- *A typical throughput model has been presented, but each exposure manufacturer has its own model.*
- *Resist sensitivity improvement is strongly desired.*
  - *Reduce source development risks.*
  - *Relax thermal management in an exposure tool.*