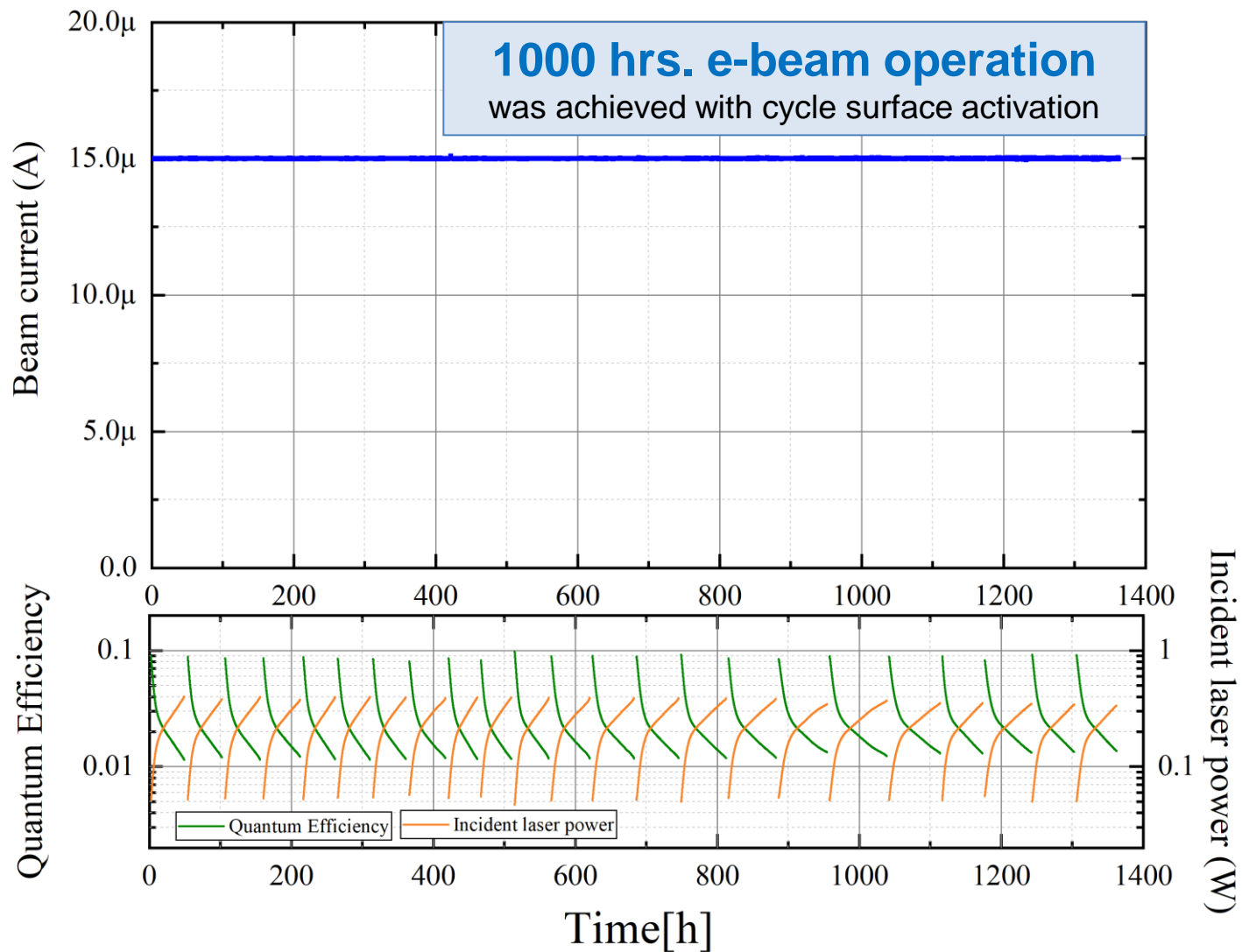


**Ideal production worthiness**

**Continuous test result**

**Reliability of the spatial resolution during beam operation**

# Continuous test result

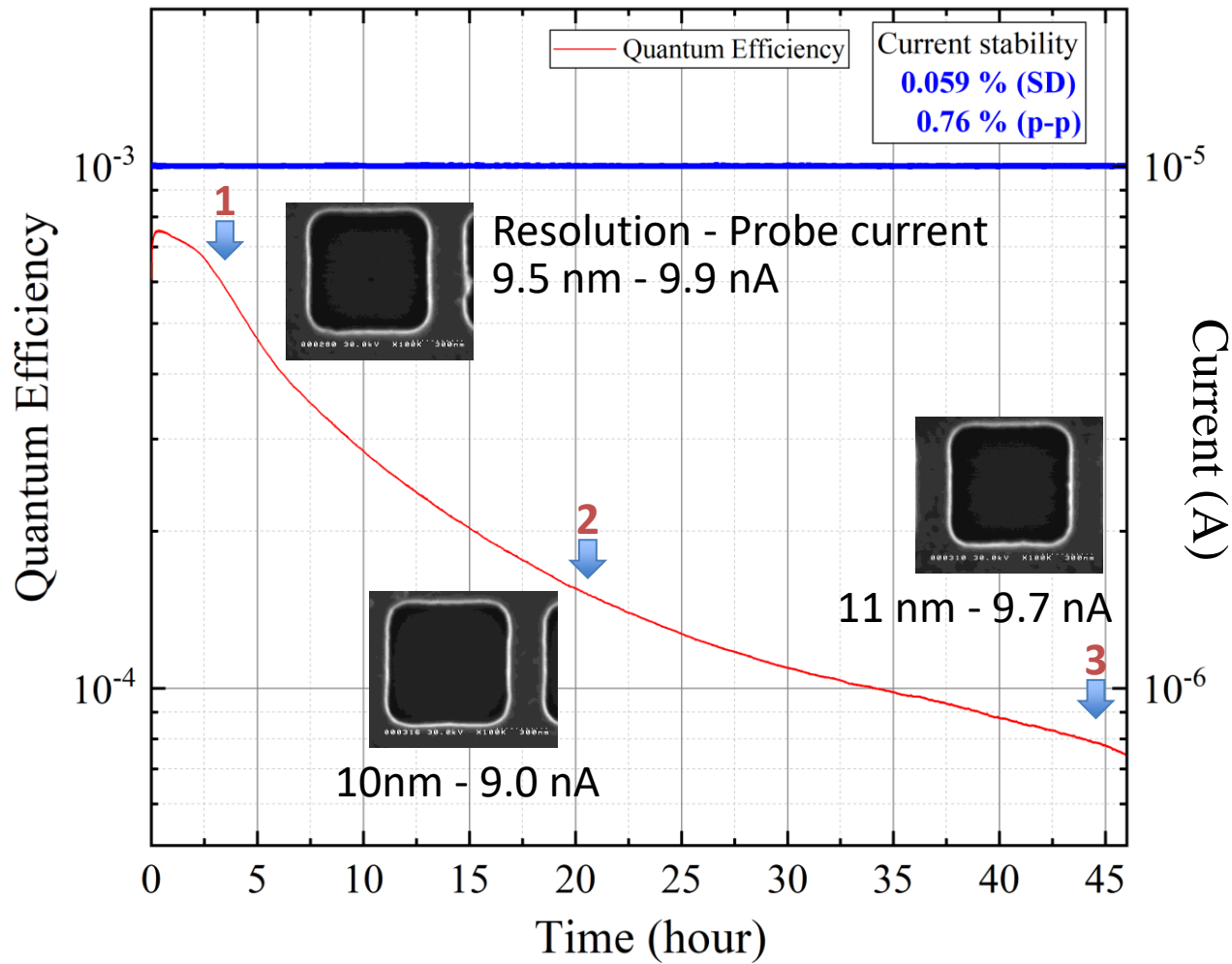


**e-beam operation with 15uA current, the stability of 0.033% ( $\sigma$ ) and uptime of 96 % (achieved) .**

:The quantum efficiency of photocathodes decrease due to the deterioration of the surface function of the photocathode. the electron beam current (blue line) is maintained stable by controlling the laser power (yellow line) according to the deterioration of the quantum efficiency (green line). The deteriorated surface function is restored by surface reactivation.

# Reliability of the spatial resolution during beam operation

The SEM image quality can be maintained with a change of less than 10% for single digit degradation of quantum efficiency.



Beam current = 10  $\mu$ A, Operation time 20 hrs. Current stability = 0.12% (SD)  
The 10nA probe current and 10nm spatial resolution on the PC-SEM was achieved with a beam current of 10uA.

SEM imaging during stable **10 $\mu$ A e-beam**.