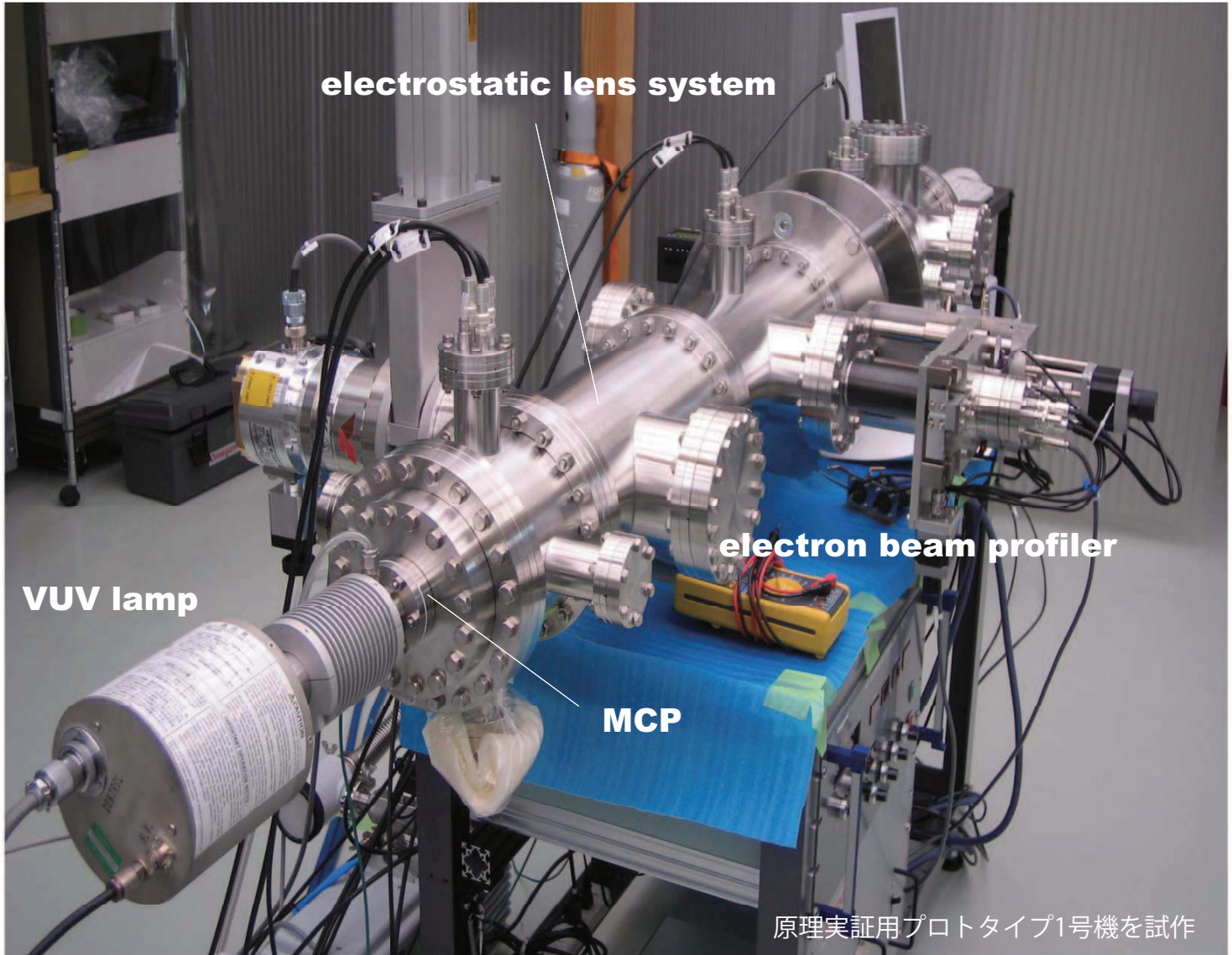
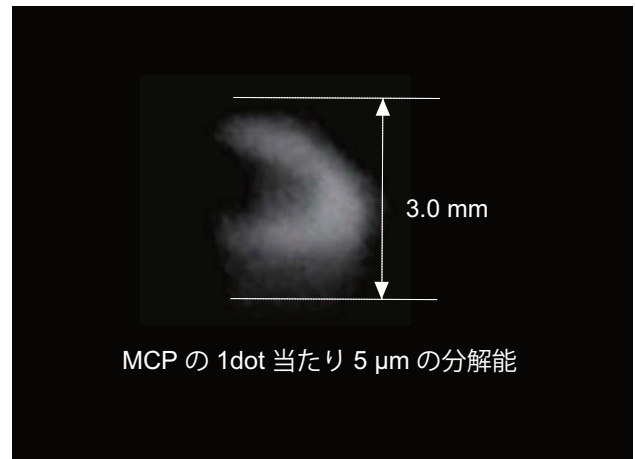
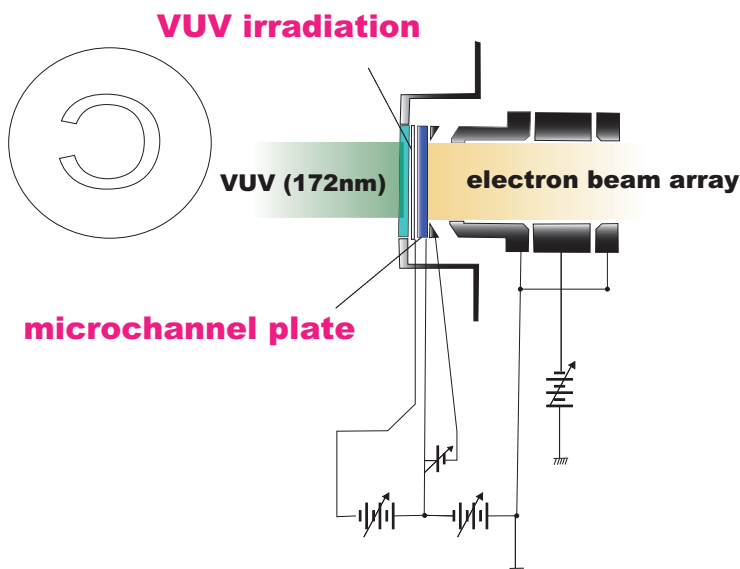


We propose a novel electron beam stepper which equips an optical projector and a micro-channel plate (MCP). The optical projector produces a two-dimensional (2D) light pattern of large integrated circuit (LSI), and the MCP converts 2D light pattern to 2D electron beam pattern. The 2D electron beam pattern is focused onto the wafer after the electromagnetic field area. This system does not need the electron beam mask, and make it possible to reduce spherical aberration caused by non-paraxial electron beam.

Prototype of MCP electron beam irradiation device



Demonstration of MCP electron beam irradiation device



**K.Kimura et al. United States Patent:
 US 7,829,863 B2, Nov.9, 2010
 ELECTRON BEAM IRRADIATION DEVICE**

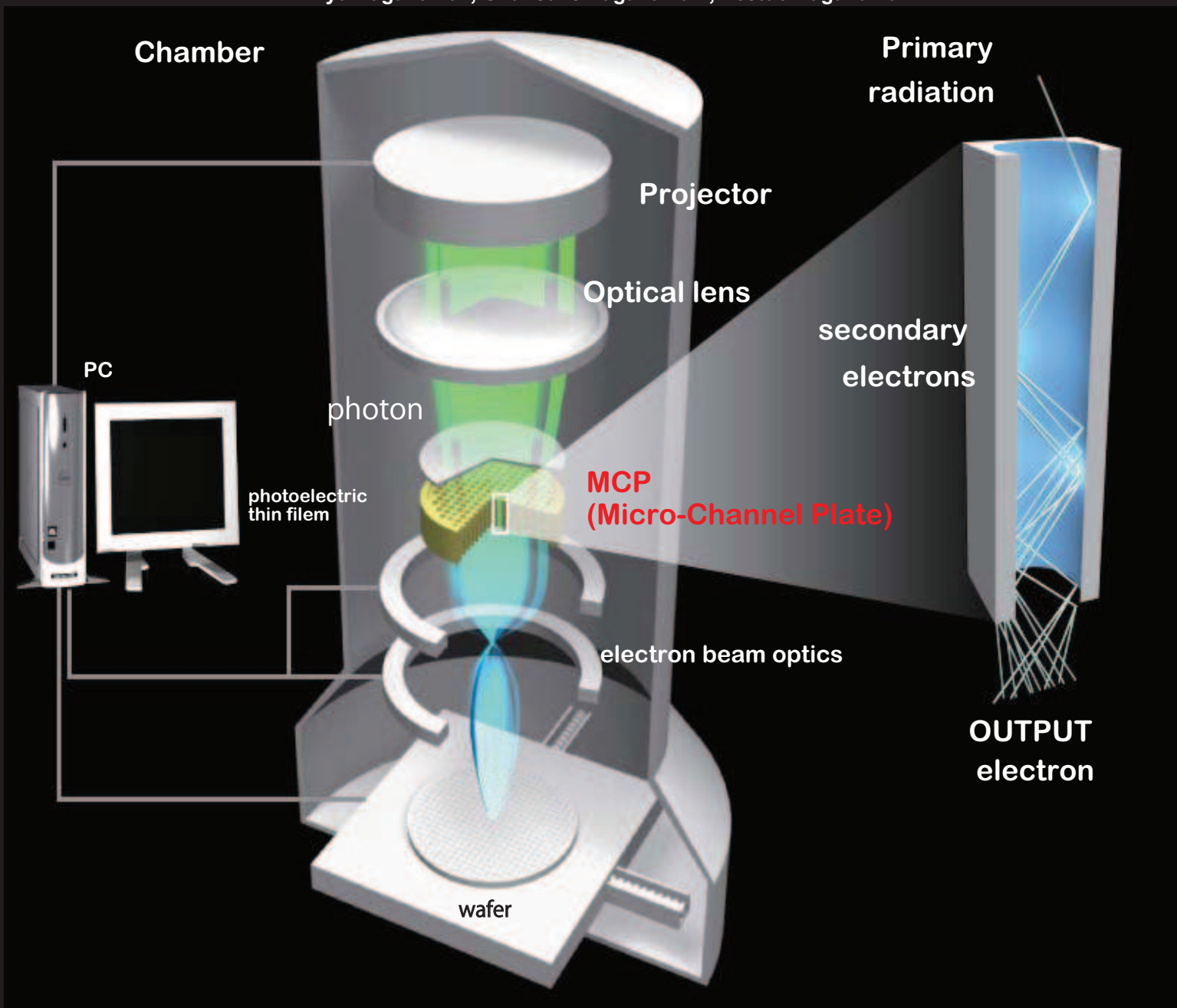


Maskless Electron Beam Stepper

マスク不要の一括電子線露光法の開発

Omegatron

Kobe Univ.¹, PRESTO², Omegatron³, Kenjiro Kimura^{1,2}, K. Fujio¹
Ryu Haganuma³, Shunsuke Haganuma³, Testuo Haganuma³



**1, High-throughput and universal
Electron beam Lithography (EBL)**
•MCP(Micro-channel Plate)
•Mask-less

2, Problem of large aberration
•Special lens system

**3, Application for high-speed
electron beam microscopy**
•Multiplex beam irradiation and
specific data acquirement procedure

K.Kimura et al. United States Patent: US 7,829,863 B2, Nov.9,2010
ELECTRON BEAM IRRADIATION DEVICE