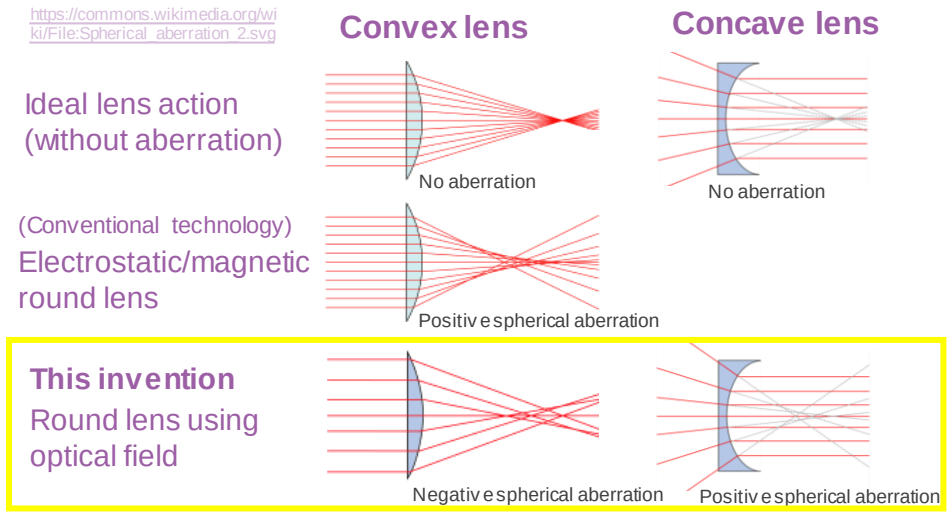
Tohoku Univ. Technology

Electron beam modulator and its modulation method

Electron round lens using optical field that can correct spherical aberration.



Overview

Since the invention of the electron microscope (EM), electrostatic and magnetic round lenses (with cylindrically symmetric lensing action) have been used in the field of charged particle optics. These lenses in principle incapable of producing **negative spherical aberration**, which had long limited the spatial resolution of EMs. Modern EMs are equipped with spherical aberration correctors consisting of multipole lenses and achieve angstrom-scale resolution. However, such devices are expensive (over a million dollars) and complicated systems. This invention solves above problems in order to have high precision, simple and low-cost electron beam focusing device. It claims the configuration of electron round lens, including **concave lens with positive spherical aberration** and **convex lens with negative spherical aberration** due to cylindrically symmetric polarized light beam.

Features

- Lens using laser for electron and other charged particle optics
- Correction of spherical aberration for improving the spatial resolution of imaging and drawing systems

For the information regarding this technology, please contact us.

Product Application

- Scanning EM, focused ion beam system, EB lithography, etc.
- Inspection of materials sensitive to magnetic fields.
- Observation, measurement and material evaluation of light element compound, organic material and biological sample, etc.

Related Works

[1] Yuuki Uesugi, Yuichi Kozawa, and Shunichi Sato Phys. Rev. Applied 16, L011002 (2021)

IP Data

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