

Realization of a New-Type Wide Acceptance Angle Electrostatic Lens

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An extremely wide acceptance angle electrostatic lens has been built for high sensitive analyzer and also for simultaneous measurement of two-dimensional angular distribution of charged particles from selected area, and for photoemission electron microscope (PEEM). In ordinary electron objective lenses the spherical aberration limits the acceptance angle to about ± 15 degree. Although, in this case, some useful functions including microscopic imaging can be provided through the design of lens system, the angular distribution of charged particles over a wide emission angle cannot be measured efficiently. Recently, a new approach for wide-acceptance-angle angular distribution measurement has shown that an ellipsoidal mesh introduced in an electrostatic lens enables correcting spherical aberration up to 120 degrees while the sample region is field free [1, 2]. Here we show the first result of the realization of this wide-acceptance objective lens. Our present lens achieves ± 50 degree acceptance angle and focusing capability with 5 times magnification with a reasonable energy resolution.

[1] patent: PCT/jp2004/016602, Japan 2004-208926

[2] H. Matsuda, H. Daimon, M. Kato and M. Kudo, Phys. Rev. E 71, 066503 (2005)