Fabrication of an in-situ magnetic TEM holder with double tilt

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Characterizing microstructure evolution of materials under external magnetic field is desirable for the magnetic research. However, the study on the magnetic materials is limited by the 2T magnetic field of objective lens, which can saturate the intrinsic magnetic properties of most magnetic field under such strong field, or the difficulty in apply the magnetic field in the TEM. It is challenging to put a magnetic coils in the tip of the sample holder due to the narrow space.
This work describes a design for in-situ magnetic holder with double tilt. A special U shape magnetic coil is fixed on the head of the magnetizing stage and the strength of the magnetic field can be adjusted by the external currentThe U shape coil can applies equal but direction-counter Lorentz force on the electron beam to limit the beam shift and avoid the image distortionThe in-plane stable magnetic field can be kept as 100 Oe and instantaneous strength can reach 140 OeAt lase, other possible configurations of applying the magnetic field will be discussed.