CLAIMS

1. A charged particle apparatus configured to project charged particles along a charged particle path toward a sample, the charged particle apparatus comprising:

a charged particle source configured to emit a charged particle beam toward a sample;

wherein the charged particle path extends from the charged particle source to the sample;

a charged particle-optical device configured to project sub-beams of a multi-beam of charged particles along the charged particle path toward the sample, the sub-beams of the multi-beam of charged particles derived from the charged particle beam;

a tube surrounding the charged particle path configured to operate at a first potential difference from a ground potential and configured to accelerate the charged particles towards the sample; and

a support configured to support the sample at a second potential difference from the ground potential, the first potential difference and the second potential difference having a difference;

wherein the first potential difference is greater than the second potential difference;

wherein at least part of the charged particle-optical device is down-beam of a most down-beam end of the tube, the charged particle-optical device that is down-beam of the most down-beam end of the tube being a down-beam device;

wherein the most up-beam electrostatic component of the down-beam device is configured to operate at substantially the same electric potential as the most down-beam end of the tube.

2. The charged particle apparatus of claim 1, wherein the down-beam device comprises an up-beam plate (i.e. being the most up-beam electrostatic component of the device) in which is defined an array of apertures for the paths of the sub-beams of the multi-beam of charged particles.

3. The charged particle apparatus of claim 2, wherein the down-beam device comprises a plurality of plates in each of which are defined an array of apertures for the paths of the sub-beams of the multi-beam of charged particles, the plurality of plates comprising the up-beam plate.

4. The charged particle apparatus of claim 2 or 3, wherein the up-beam plate is a sub-beam forming array, the apertures configured to form the sub-beams of the multi-beam of charged particles from the charged particle beam from the charged particle source.

5. The charged particle apparatus of claim 4, wherein the plurality of plates comprises a beam shaping aperture array in which is defined an array of beam shaping apertures for shaping the sub-beams of the multi-beam of charged particles, the beam shaping aperture array being down-beam of the up-beam plate.

6. The charged particle apparatus of any preceding claim, wherein the down-beam device comprises an objective lens array comprising a plurality of objective lenses configured to focus respective sub-beams of the multi-beam of charged particles on the sample.

7. The charged particle apparatus of any preceding claim, wherein the down-beam device comprises a detector and at least part of the detector array is comprised in a most down-beam plate of the down-beam device.

8. The charged particle apparatus of any preceding claim, wherein the charged particle-optical device comprises a scan deflector configured to deflect respective portions of the charged particle beam to cause the sub-beams of the multi-beam of charged particles to be scanned over the sample.

9. The charged particle apparatus of any preceding claim, wherein the tube comprises a plurality of sections, each section extending along different positions along the charged particle path and surrounding the charged particle path.

10. The charged particle apparatus of claim9, wherein the charged particle-optical device comprises at least one electrostatic component located between adjacent sections of the tube.

11. The charged particle apparatus of any preceding claim, wherein a potential difference between a most down-beam component of the charged particle-optical device and the ground potential is less than the first potential difference.

12. The charged particle apparatus of any preceding claim, wherein the charged particle source comprises a cathode and an anode configured to operate with a potential difference between the cathode and the anode so as to emit the charged particle beam, wherein the tube is at the same electric potential as the anode and the sample is at the ground potential.