4. Experiment contents

1) Learn to study electrostatic fields using simulation method.
2) Deepen the understanding on concepts of strength and potential of electric fields.
3) Map the equipotential lines and electric field lines of a coaxial cable and a pair of parallel wire electrodes.

5. Experiment procedure

1) Set up the apparatus

   Place the conductive glass plate to be tested on the lower level of the conductive glass support. Connect the positive and negative "Output" terminals of the DC power supply of the main electric unit to the "+" (positive) and "-" (negative) terminals of the conductive glass plate using the plug wires. Connect the positive "Measure" terminal of the main electric unit to the socket on the beam of the probe and the negative "Measure" terminal to the negative "Output" terminal directly. Plug in the power cord and turn on the power switch.

2) Adjust the output

   Toggle the selection switch below the DC voltmeter to the side "Output". At this time, the DC voltmeter displays the output voltage. Adjust the output voltage to a proper value (It is recommended to be adjusted to 8 – 15 V).

3) Pointing measurement

   Toggle the selection switch to the side "Measurement". Lay a piece of A4 size white paper or coordinate paper on the plexiglass plate on the upper level of the conductive glass support. Place the probe to the lower level and let it contact with the conductive glass. At this time, the DC voltmeter displays the voltage value at the contact point. Make the needle tip on the upper level 2 - 5 mm higher from the white paper or coordinate paper (can slightly adjust the beam height of the needle). Insert a piece of carbon paper between the needle and the white paper or coordinate paper, and gently press the needle. The corresponding point on the lower level is recorded on the paper in synchronous. Do the same to record series points (the output voltage of the DC power supply cannot be adjusted during the measurement process).

4) Draw equipotential lines and electric field lines

   Draw equipotential lines of different voltage values by drawing point lines according to voltage values and positioning points, and draw electric field lines according to equipotential lines.

Attention:

1) Take care to use the conductive glass plate. Do not scratch it with sharp objects.
2) Do not short circuit the positive and negative poles of the DC power supply.
3. Do not forcibly bend the two beams of the probe and the needle.