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INVESTIGATION OF RESISTANCE TO HIGH-VOLTAGE VACUUM BREAKDOWN OF ION AND PLASMA-MODIFIED MATERIALS FOR ACCELERATOR STRUCTURE OF THE CLIC COLLIDER

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The European Centre for Nuclear Research (CERN) is developing and constructing the Compact Linear Electron Collider (CLIC), which is planned to reach an energy of ˜4.3 TeV in the centre of mass system. In the high-frequency structures of this collider, it is planned to achieve accelerating gradients of 100 MV.
An extremely important task is to conduct comprehensive research on the choice of material for the manufacture of elements of the accelerating structures of the CLIC collider, and to develop a technology for processing its surface, which would make it possible to achieve the required values of accelerating gradients.
The Institute of Applied Physics of the National Academy of Sciences of Ukraine proposed, developed and tested plasma and ion-beam methods for modifying the surface layers of copper samples, which increase the resistance of their surface layer to vacuum breakdowns and reduce the likelihood of their occurrence.
It is shown that such modification of copper surface layers can significantly increase the resistance of copper samples to high-voltage breakdowns.

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