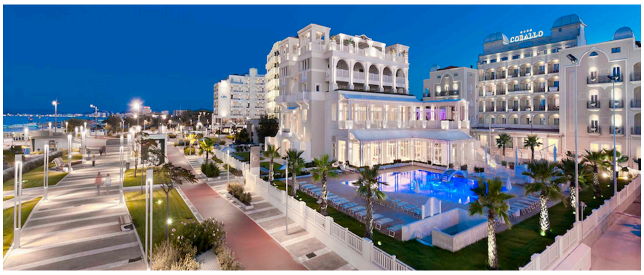

Contribution ID: **8**

Type: **poster**

The phenomenon of monoenergetic electron generation in the pyroelectric accelerator

Tuesday, 6 June 2023 18:13 (1 minute)

The change in temperature of single crystals in vacuum conditions, such as lithium tantalate (LiTaO3), gives an attractive possibility to generate and accelerate electron and positive ions fluxes up to 100 keV and more. Also, the generation of X-ray and neutron fluxes in this way is very productive. The conception of a pyroelectric accelerator implies a compact device, which does not require an external high-voltage circuit and the use of hazardous materials.
One of the interesting features of the pyroelectric accelerator is the generation of monoenergetic electron flux with a stable value of peak energy for a long time. The reason for such long-term stabilization of flux energy is not clear yet. Here we present studies of features of electron flux in pyroelectric accelerator depending on the pressure of residual gas, the distance between the crystal and the target-collimator. The correlation between monoenergetic electron production and avalanche discharge in the pyroelectric accelerator is discussed. Besides of that, the simulation of electron motion in a pyroelectric accelerator is presented and discussed.
The work was supported by the grant from the Russian Science Foundation (project №21-72-00006). The work of A.K and P.S. was financially supported by a Program of the Ministry of Education and Science of the Russian Federation for higher education establishments, project No. FZWG-2020-0032 (2019-1569).

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Session Classification: PS: Poster Session