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# Future look of a high-temperature nuclear power unit

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*The paper discusses some technical solutions allowing to implement a collisionless mode with surface ionization in high-temperature thermionic nuclear power units and to formalize their future look. On the base of analysis we selected structural materials capable of providing performance and required output parameters at increased temperatures of electrodes. In particular, to provide the isothermal condition for the energy converter we consider a structural configuration with the energy converter placed beyond the reactor core. As a result, we obtain a perspective single-channel multi-element configuration of the electro-generating unit, which considers disadvantages of both single-element configuration and classic multi-element configuration. Besides, structural configuration of thermionic electro-generating assembly with the external nuclear fuel placement, which provides the simplicity of the design and the principle of modularity, is proposed. For further development of the suggested design a tentative estimation using CFD-software Star-CCM+ was carried out. It represents a static thermal numerical computation of channel's part with a length of 10 mm. Computation results are presented in the paper.*

**Keywords:** nuclear power unit, high-temperature thermionic unit, thermionic converter, external placement, heat pipe, configuration, static thermal computation, future look.

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