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Next generation high-current switching devices, based on Cs-Ba plasma. ALEKSANDR MUSTAFAEV, Saint Petersburg Mining University, Saint Petersburg, Russia, VICTOR KUZNETSOV, Ioffe Institute RAS, Saint Petersburg, Russia, VLADIMIR SOUKHOMLINOV, Saint Petersburg State University, Saint Petersburg, Russia, ARTEM GRABOVSKIY, Saint Petersburg Mining University, Saint Petersburg, Russia — In this talk we discuss the research into plasma's electro kinetic parameters of Knudsen high-current diode and triode switching devices. It was found that the phenomenon of spontaneous current breakage has a big influence on the efficiency of discharge quenching. Unique regimes for grid discharge quenching were attained: the increase in the modulated power is accompanied by the decrease in the power consumption. Unprecedented energy parameters were obtained: stable frequency modulation in the range from 1 to10 kHz, an anode potential of 50 V, the electric power density of 5 kW/cm^2 and the efficiency more than 95%. Experiments with the grid-less modulator based on the thermionic diode demonstrate the following results: The current modulation is formed as result of plasma structure generation in the electrode gap without applying any external forces. The experiments on the Cs-Ba Knudsen diode demonstrate the feasibility of creating a full current modulation at an ignition voltage of 5...6 V and a discharge current density of ˜10 A/cm^2. At a gap of 0.2...2 mm, a stable current and voltage modulation of 5...20 kHz frequency exists in a Cs-pressure range from 1.5•10^{-3} to 3.5•10^{-3}Torr. The possibility of the modulation process control via additional external forces was discovered.

Aleksandr Mustafaev
Saint Petersburg Mining University, Saint Petersburg, Russia

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