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Plasma behavior for LaB_6 thermionic hollow cathode in low-pressure deuterium[1] ANDREY MESHKOV, JASON TROTTER, DAVID SMITH, AHARON YAKIMOV, GE Research — We are developing a fast inline medium-voltage direct current (MVDC) circuit breaker based on a gas discharge tube (GDT). The guiding market for the GDT breaker is the uprating of existing medium-voltage alternating current (MVAC) distribution corridors into a meshed MVDC grid to meet growing power demands in congested urban areas without the need to clear new rights-of-way. A long-life, low forward-voltage drop thermionic hollow cathode is an enabling technology for the GDT as an inline circuit breaker. We will give an overview of the hollow cathode design considerations for the performance and life requirements and present experimental results of cathode-plasma performance in low-pressure deuterium, showing plasma voltage below 25V for cathode current densities >4 A/cm^2.

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Andrey Meshkov
GE Research

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