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Tripple langmuir Probe diagnostic for vacuum arc thrusters

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Vacuum arc thrusters are an interesting technology for generation of uN thrust pulses suitable for position control. The simplicity and compact design due to its solid fuel make it particularly interesting for small satellite applications. By now the limiting factor for the usage of vacuum arc thruster is the reliability of the system which limits the current pule number to about one million. In order to understand how to make the vacuum arc thruster operate reliably for more than 10 million pulses an online diagnostic is needed which allows to evaluate the quality of the thrust and diagnose the failure of the thruster.
The triple Langmuir probe technique is a probe technique which allows an online time resolved measurement of the electron temperature and density in pulsed plasma applications. Thus various information about the vacuum arc inter-electrode plasma and hence the relative thrust change of the system can be deduced.
In this work a triple Langmuir probe system was build according to the requirements of the vacuum arc. Measurements with different cathode materials were conducted in order to evaluate its performance as an online diagnostic tool.

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