

Overview of DC Spark Systems

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	System I ("High rep-rate system")	System II	System III ("Fixed gap system")
Capabilities	<ul style="list-style-type: none"> -Fully automated, can run measurement series at a repetition rate of 1 kHz -Charging Pulse Integration gap capacitance (i.e. distance) measurement -High bandwidth 	<ul style="list-style-type: none"> -Field emission (β-parameter) measurement -LCR Bridge gap capacitance (i.e. distance) measurement -Motorized anode movement 	<ul style="list-style-type: none"> -Precision-manufactured electrodes -Large electrode surface -Antennae inside vacuum chamber -Small and mobile
Limitations	<ul style="list-style-type: none"> -No field emission measurement -Slow pulse roll-off 	<ul style="list-style-type: none"> -Low rep-rate due to Ross switch -BD voltage and capacitance measurement in different circuits, switching needed 	<ul style="list-style-type: none"> -No field emission measurement -Gap comes "as is", no tuning or tweaking possible
Upgrade plans	<ul style="list-style-type: none"> -Motorized anode movement 	<ul style="list-style-type: none"> -Temperature control integrated with gap distance control -High rep-rate and variable pulse length circuit 	<ul style="list-style-type: none"> -Rep-rate circuit -Use antennae to localize breakdown
Experiments (current and upcoming)	<ul style="list-style-type: none"> -BDR dependency on electric field for different gap sizes 	<ul style="list-style-type: none"> -Non-contact BD field measurement using iridium cathode -Cathode void effect on BD field 	<ul style="list-style-type: none"> -BDR dependency on external magnetic field