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RF Conditioning of CLARA's 1.5 cell S-band Photoinjector

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The CLARA accelerator (Compact Linear Accelerator for Research and Applications) located at Daresbury Laboratory in the UK has a new 1.5 cell S-band photoinjector designed by ASTeC (Accelerator Science and Technology Centre). The photoinjector underwent RF conditioning between October last year and March this year to obtain a peak E-field of 70MV/m and a pulse length of 2 μ s. This was carried out by a mixture of expert manual and automated conditioning using ASTeC's NO-ARC (No Operator Automated RF Conditioner) conditioning script which allowed for conditioning at higher repetition rates and 24 hour operation. Here we detail the highlights of the RF conditioning period including some anomalous breakdown traces and behaviour where the cavity would suffer breakdowns below that of the frontier target powers. The causes of this unusual conduct are still being actively investigated.

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