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Split 6GHz SRF thin film cavities

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Many current accelerators use cavities that are manufactured as two half cells that are electron beam welded together, across the peak surface current of the cavity. This weld can limit the performance of Thin Film (TF) coated cavities by causing an increase in the surface resistance. Many problems with the coating process for TF Superconducting Radio Frequency (SRF) cavities are also due to this weld. TF SRF cavities can perform as well as bulk niobium cavities if the cavity is manufactured seamlessly, without any weld, however, they are much more difficult and expensive to manufacture. A cavity with a split parallel to the direction of the electric field, would not need to be welded. These cavities are easier to manufacture and coat. Thus, different coating techniques may be used leading to new materials and multilayer coating options which may allow SRF cavities to operate at better parameters than current state of the art cavities.
TF SRF cavities have been developed for use in particle accelerators, as they have many advantages over normal conducting and bulk niobium cavities. One such advantage is that SRF TF cavities have a lower surface resistance, below the critical temperature, than NC cavities and a higher thermal conductivity than bulk niobium cavities leading to a more uniform temperature of the superconductor.
This work discusses development and testing of longitudinally split seamless TF SRF cavities at Daresbury Laboratory

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Footnotes

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