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First magnetic field penetration results of Multilayer samples and A15 materials for the use in SRF applications.

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Superconducting radiofrequency cavities made of bulk Nb are reaching their theoretical limits in the maximum accelerating gradient, E_{acc} , where E_{acc} is limited by the maximum magnetic field, B , that can be applied on the surface of the accelerating cavity wall. To increase E_{acc} , the maximum B field, B_{max} , which can be applied to the surface, must also be increased. The A15 materials or multilayer structures are the potential solution to increase B_{max} . Since coating and RF testing of full size RF cavities is both expensive and time consuming, one needs to evaluate new ideas in superconducting thin films quickly and at low cost. A magnetic field penetration experiment has been designed and built at STFC Daresbury Laboratory to test superconducting samples (< 100 mm $\varnothing$). The facility produces a parallel DC magnetic field, which is applied from one side of the sample to the other similar to that in an RF cavity. The facility applies an increasing magnetic field at a set temperature to determine the field of full flux penetration which can give an insight into the quality and structure of the superconducting structure. The facility has been characterised using both type I and type II superconductors and is now producing results from new novel materials such as the A15 and Thin film samples which will be presented.

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