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Field-History Dependence of the Superconducting Transition Temperature in Erbium/Niobium Bilayers JAMES WITT, NATHAN SATCHELL, University of Leeds, SEAN LANGRIDGE, STFC, GAVIN BURNELL, University of Leeds — Recently, there has been much interest in a new class of superconducting (S) spintronic devices based upon hybrid S/F (ferromagnet) heterostructures. The prototypical super-spintronic device is the superconducting spin valve (SSV), within which the critical temperature (Tc) of an S layer can be controlled by the relative orientation of two or more F layers. Such manipulation of the F layers requires careful engineering of the heterostructure and the rotation of the structure with respect to an applied magnetic field. Here, we show that such control over Tc is also possible in a simple S/F bilayer. By manipulating the remenant magnetic state of a thin Er layer – which is proximity coupled to a Nb S layer – we are able to demonstrate a high level of control over the Tc of the Nb (which is measured in zero field). The shifts in Tc are comparable in size to the largest seen in the SSV and are manipulated using solely the field history. The system can be reset by warming the sample through the Er Curie temperature (approximately 20 K). Our results are of particular interest due to the simplicity of both the bilayer and the measurement geometry in comparison to the SSV.

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