Abstract Submitted
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Studying the superconductor-ferromagnet proximity effect with polarised neutron reflectometry NATHAN SATCHELL, JOSHANIEL COOPER, CHRISTY KINANE, STFC Rutherford Appleton Labs, JAMES WITT, GAVIN BURNELL, University of Leeds, SEAN LANGRIDGE, STFC Rutherford Appleton Labs — At the interface between a superconductor (S) and ferromagnet (F), an inhomogeneity can convert singlet Cooper pairs into the (spin aligned) long ranged triplet component (LRTC). The manipulation of the LRTC forms the basis of the emerging field of super-spintronics. Several theoretical works predict modification to the local magnetic state inside the S layer with the inclusion of triplet Cooper pairs, however there are now several experimental observations which disagree on both the magnitude and direction of this induced moment (see for example [1] and [2]). Here we report on measurements of the proximity effect using polarised neutron reflectometry, a technique sensitive to changes in the total magnetisation of a S-F heterostructure. Our results suggest that a 'smoking gun' direct signature of the LRTC is below the sensitivity of our technique, we are able to study the inverse effect namely a modification to the ferromagnetism by proximity to singlet superconductivity. These observations are supported by XMCD measurements showing changes to the Fe and Co below the S layer T_c.

[1]M. G. Flokstra, *et al.*, **Nat. Phys.** doi:10.1038/nphys3486 (2015)
[2]Di Bernardo, *et al.*, **Physical Review X**, 5(4), 1-7. doi:10.1103/PhysRevX.5.041021 (2015)

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