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Observation of a triplet structure in d-wave Feshbach resonances YUE CUI, MIN DENG, CHUYANG SHEN, SHEN DONG, CHENG CHEN, State Key Laboratory of Low Dimensional Quantum Physics, Department of Physics, Tsinghua University, BO GAO, Department of Physics and Astronomy, University of Toledo, MENG KHOON TEY, LI YOU, State Key Laboratory of Low Dimensional Quantum Physics, Department of Physics, Tsinghua University; Collaborative Innovation Center of Quantum Matter — A d-wave Feshbach resonance between the 85 Rb $|2, -2\rangle + ^{87}$ Rb $|1, -1\rangle$ scattering channel is observed in a mixture of ultracold ⁸⁵Rb and ⁸⁷Rb atoms. Analogous to the well-known doublet splitting of the p-wave resonance in 40 K [1], we find a triplet structure originating from the magnetic dipoledipole interaction between the valence electron spins of the two heteronuclear atoms. The three components of the resonance are respectively associated with the partial wave projections onto the direction of the magnetic field being $m_l=0, |m_l|=1$ and $|m_l|=2$. Such an interpretation and our observations are well characterized using the semi-analytic multichannel quantum-defect theory [2]. This work opens up new possibilities of studying the anisotropy in d-wave interaction dominated physics.

 C. Ticknor, C. A. Regal, D. S. Jin, and J. L. Bohn, Phys. Rev. A 69, 042712 (2004).

[2] Bo Gao, Phys. Rev. A 84, 022706 (2011).

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