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M1Or2D-02: [Invited] Superconductivity beyond the Pauli limit tuned by locally enhanced Landé g-factor in Au(111)-superconductor heterostructures

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In this work, we report unconventional superconducting properties of high quality Au(111)/Nb heterostructure samples. We carry out tunneling studies in Au(111) using planar tunneling devices with a highly transparent barrier, which enhances the energy resolution of tunneling spectroscopy and allows us to observe and analyze fine in-gap states. We show a locally enhanced Zeeman field due to a large Landé g-factor at the barrier/Au(111) interface, and a broken of Pauli limit at the surface of Au(111) while maintaining bulk superconductivity. We will also show tunneling results along nanowires of magnetic insulators coupled to Au(111). Our work paves the way for searching and confirming robust topological superconductivity in the Au(111) platform.

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