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Microstrip SQUID amplifiers with submicron junctions for enhanced gain[1] M.P. DEFEO, P. BHUPATHI, K. YU, T.W. HEITMANN, M. WARE, C. SONG, B.L.T. PLOURDE, Syracuse University, R. MCDERMOTT, University of Wisconsin — Recent progress in dc SQUID amplifiers suggests that these devices might approach quantum-limited sensitivity in the microwave range. With the signal coupled to the stripline resonance formed between the input coil and the SQUID washer – the microstrip SQUID amplifier configuration – gains of typically around 20 dB are possible at frequencies of several hundred MHz, and the gain is limited by the maximum voltage modulation available from the SQUID. Larger gain would be advantageous in pursuing the quantum limit and one route for achieving this involves using larger resistive shunts. However, maintaining non-hysteretic device operation requires smaller junction capacitances than is possible with conventional photolithographically patterned junctions. We have fabricated microstrip SQUID amplifiers using Al-AlO_x-Al submicron junctions and large shunts. These devices exhibit substantially larger gain than is possible with SQUIDs containing micron-sized junctions. We discuss the prospects for enhanced gain in the microwave range.

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