Near-field Scanning SQUID Microwave Microscope

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Abstract. - We developed a scanning SQUID microscope utilizing DC SQUID with novel readout electronics capable of sensing coherent magnetic fields from 50 to 200 MHz. To overcome the bandwidth limitation of traditional closed-loop SQUID magnetometers, we employ a flux-modulated closed loop to simultaneously lock the quasi-static magnetic flux and flux-bias the SQUID for amplification of RF flux. Demodulating the SQUID voltage with a double lock-in technique yields the signal proportional to the amplitude and phase of RF magnetic field. We describe the system performance and present images of a variety of samples.

Keywords - DC SQUID, SQUID microscope, near-field scanning microscope, high-frequency SQUID microscope, double lock-in technique.

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