# Abstracts

## The Investigation of an Electron Resonance Spectrometer Utilizing a Generalized Feedback Microwave Oscillator (Jan. 1964 [T-MTT])

*J.B. Payne, III. "The Investigation of an Electron Resonance Spectrometer Utilizing a Generalized Feedback Microwave Oscillator (Jan. 1964 [T-MTT])." 1964 Transactions on Microwave Theory and Techniques 12.1 (Jan. 1964 [T-MTT]): 48-54.*

In this investigation, an entirely different approach is taken toward the development of a "self-stabilized" paramagnetic resonance (EPR) spectrometer system which eliminates the usual low-power klystron oscillator, electronic frequency stabilizing equipment, and the complex superheterodyne detector without sacrificing loss of detection sensitivity. This system which is known as an oscillator spectrometer consists of a microwave amplifier containing a sample-carrying network element in the positive feedback loop. The microwave device oscillates at the network's central resonant frequency with essentially instantaneous frequency stability. Expressions relating the change in power level and frequency of oscillation as a function of the change in the network attenuation and phase at magnetic resonance are derived. The system's ultimate sensitivity is determined by analyzing the noise within the oscillator loop. In general, the noise that limits the detection of the resonance signal is principally that generated by the amplifier, and thus a simple video detector can be used. The sensitivity of this spectrometer was found to be comparable with that of the conventional bridge type spectrometer.

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