Abstracts

The Investigation of an Electron Resonance Spectrometer Utilizing a Generalized Feedback Microwave Oscillator (1963 [MWSYM])

J.B. Payne, III. "The Investigation of an Electron Resonance Spectrometer Utilizing a Generalized Feedback Microwave Oscillator (1963 [MWSYM])." 1963 PTGMTT National Symposium Program and Digest 63.1 (1963 [MWSYM]): 183-188.

The purpose of this investigation was to determine the technical feasibility and the attainable sensitivity of a "self-stabilized" oscillator-spectrometer system in terms of a generalized sample-carrying feedback element to replace the conventional spectrometer systems. This new "self-stabilized" oscillator-spectrometer has a microwave amplifier with a generalized network element in the positive feedback loop causing oscillation to occur at the network's central resonant frequency, with essentially instantaneous frequency stability. This eliminates the need for electronic frequency stabilizing equipment. With the paramagnetic test sample located in the H field of the generalized feedback element, the network's attenuation and phase characteristics are altered when paramagnetic resonance occurs. The resultant problem is to determine the effect this charge has on the oscillator's amplitude and frequency of oscillation. From this, the system's ultimate sensitivity is determined from a consideration of the noise within the oscillator loop.

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