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Superconducting Quantum Interference Filters as Detectors of AC Magnetic Fields CHRISTOPHER PORTER, Ohio State University / Otterbein University — A theoretical study is presented of the voltage responses of 1-D arrays of N Josephson junctions to AC and DC magnetic fields. Numerical results are shown for various values of parameters such as the number of junctions N, the relative strengths of the AC and DC magnetic fields, and the frequency of the incoming AC field. An analytical description of the smearing effect of AC fields on the voltage signal is also discussed in some parameter regimes. Detection of small-amplitude AC fields using both uniform and non-uniform junction spacing is demonstrated. Considerable difficulty in determining large-amplitude AC fields highlights the need for a voltage response that is monotonic in flux for AC signal detection. Non-uniform spacing is examined to eliminate the voltage signal's Φ_0-periodicity in flux, allowing Josephson arrays to function as absolute detectors of AC (and DC) magnetic field. Various junction spacing schemes are considered in an effort to optimize the voltage signal produced by the array for the detection of AC magnetic fields. Extremely long periods are achieved, but a monotonic voltage response remains elusive.

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