Abstract Submitted
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Magnetic Shield Design and Processing MICHAEL BULATOWICZ, Northrop Grumman — Magnetic shielding is a necessary component of many sensitive instruments including those required for a wide array of atomic and molecular physics experiments and inertial instruments, but what are the critical parameters influencing the performance of the shields? How can one achieve the greatest shielding factor in a limited physical space? What are the limits to shield performance? Shield thickness, size, number of layers, distance between layers, material, and so on all have influence on the performance. Magnetic permeability alone depends on incident magnetic flux density, magnetostriction effects, shield material impurities, material microstructure, crystalline grain size, mechanical strain, skin depth effects, and shield size and thickness. Magnetic noise produced by the shields is a function of magnetic permeability, temperature, and shield thickness, electrical resistivity, and size. These phenomena and the ability to control the influence of these parameters for a given instrument will be discussed. A set of design and processing guidelines and generalized equations will be presented for the purposes of optimizing the magnetic shielding design and thereby achieving the highest possible performance from a magnetically shielded instrument.

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