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Optimization of Geometries for Experimental Searches of Chameleon Scalar Fields VLADIMIR SKAVYSH, Indiana University-Purdue University Indianapolis, MUHAMMAD ARIF, National Institute of Standards and Technology, CHANDRA SHAHI, ROBERT HAUN, Tulane University, MIKE SNOW, KE LI, Indiana University Bloomington, BENJAMIN HEACOCK, ALBERT YOUNG, North Carolina State University, INDIANA UNIVERISTY TEAM, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY TEAM, NORTH CAROLINA STATE UNIVERSITY TEAM — The chameleon scalar field theory is a dynamic model of dark energy. This model is unique in that it gives predictions which can be tested in terrestrial experiments. Here, we consider the prediction that the chameleon field exacts a force on objects in vacuum. Due to symmetry of typical objects, this force is usually miniscule. However, the chameleon force on a single surface can be surprisingly large, which is why we investigate whether there exist geometries for which the net chameleon force on an object is large enough to be measured. Moreover, we consider multi-body systems, such as the setup of the high-frequency short-range gravity experiment at Indiana University (arXiv:hep-ph/0303057v2), which consists of three oscillating parallel plates.

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