Abstract Submitted
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Self-forces on static bodies in arbitrary dimensions PETER TAYLOR, ABRAHAM HARTE, EÁNNA FLANAGAN, University College Dublin — I will present exact expressions for the scalar and electromagnetic self-forces and self-torques acting on arbitrary static extended bodies in arbitrary static spacetimes with any number of dimensions. Non-perturbatively, these results are identical in all dimensions. Meaningful point particle limits are quite different, however. I will discuss how such limits are defined and evaluated, resulting in simple "regularization algorithms" which can be used in concrete calculations. In them, self-interaction is shown to be progressively less important in higher numbers of dimensions, generically competing in magnitude with increasingly high-order extended-body effects. Conversely, self-interaction effects can be relatively large in $1+1$ and $2+1$ dimensions. It will further be shown that there is considerable freedom to use different "effective fields" in the laws of motion. Different choices give rise to different inertias, gravitational forces, and electromagnetic or scalar self-forces. However, the particular combinations of these quantities which are observable remain invariant under all possible field redefinitions.

Peter Taylor
University College Dublin

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