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**Challenging the fundamental interactions in nature: Can  $1/r$ -interactions, like the gravitational and Coulomb interactions, be induced interactions?** BO E. SERNELIUS, Linköping University — Two of the fundamental interactions in nature, the Coulomb interaction and the gravitational interaction, vary with distance as  $1/r$ . Here we address the question if an induced, as apposed to fundamental, interaction could have this distance dependence. We show that in theory it is possible to obtain a Casimir interaction potential that varies with distance as  $1/r$ . We achieve this by invoking hypothetical particles having a harmonic oscillator interaction potential. These particles generate fields that are different from the ordinary electromagnetic fields. The derivation parallels the derivation of the Casimir-Polder interaction between atoms in electromagnetism. The derivation relies on the harmonic oscillator interaction between the particles and Einstein's two postulates in special relativity.

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