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Tests of fundamental symmetries

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"Fundamental symmetry" refers to invariance of the laws of Nature, including the values of fundamental constants, with respect to a continuous or discrete transformation such as translation in space or time, rotation, spatial (P), time (T), or charge (C) reversal, combinations of these, or permutation of identical quantum particles. All discrete symmetries except for the combined CPT and the permutation symmetry are experimentally known to be violated by the weak interactions; intense searches are conducted for possible small violations of the still-standing discrete as well as the continuous symmetries, which may result from exotic beyond-the-standard-model interactions. In this talk, I will describe some of the recent fundamental-symmetry tests involving our research group (for up-to-date bibliography see http://budker.berkeley.edu/PubList.html), including measuring the effect of the gravitation-field gradient on the value of the fine-structure "constant," and searching for transient and time-dependent effects on atomic magnetometers and clocks.