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Probing the Atomic Higgs Force

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The interaction strength of the Higgs boson to the building blocks of matter, the electron and up and down quarks, are essentially unknown. Probing these coupling is an important test of the SM which could lead not only to the establishment of new physics but also to an alternative understanding of the flavor puzzle. We propose a novel approach based on isotope shift measurements in atomic clock transitions in order to probe the Higgs-to-light-fermion couplings. Assuming state-of-the-art accuracy in frequency measurements in these systems, the sensitivity of the proposed method surpasses that of the LHC experiments.

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