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Improved description of the nucleon polarizabilities with relativistic chiral effective field theory

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The electromagnetic structure of the nucleon has an increasing interest for experimental searches of physics beyond the standard model in the precision frontier. The reason is that, due to the remarkable accuracy of the experimental measurements, it is crucial to have a good understanding over all possible contributions. The polarizabilities give the information about the two photon exchange contributions stemming from the internal electromagnetic structure of the nucleon. This is specially important for the so-called "Proton Radius Puzzle". In this talk I will show how in a recent calculation in the relativistic formulation of chiral effective field theory with the Delta degrees of freedom, we could achieve a prediction of the low Q^2 behaviour of the scalar and spin polarizabilities that is in good agreement with the MAID model and experimental data.

Finally I will show the impact of this improved theoretical approach to the estimation of the order alpha_{em}^5 polarizability correction to the Lamb shift.

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