Towards condensed matter effects in electron capture for new physics

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INTRODUCTION

Following the advent of novel quantum sensors, direct detection of the recoiling ion following electron capture is experimentally accessible. With it come a host of novel ways to look for physics Beyond the Standard Model, but the added complexity of a radioactive decay in-medium is currently poorly understood.

DESCRIPTION OF THE WORK

The project consist of work towards an extension of the beta decay formalism to include condensed matter effects. This will proceed in incremental steps, starting with atomic physics results by developing numerical routines, and - time permitting - followed by conceptual developments to rewrite the beta decay process using the Kubo-Greens formalism.

REQUIREMENTS

Strong python skills, a good understanding of nuclear and condensed matter state physics and many-body Green's functions.