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## Probing the proton Axial Vector Form Factor with an inverse β-decay experiment

The Axial-Vector Form Factor (AVFF) is so far largely unknown compared to the other form factors of the nucleon. Only its normalisation at  $Q^2 = 0$  is experimentally well known from  $\beta$  decay.

Most AVFF experimental knowledge at  $Q^2 > 0$  is owing to  $\nu$  quasi-elastic scattering on nuclei, and is therefore strongly affected by the determination of  $\nu$  beam energy; low statistics; also need of nuclear models, as recently shown by results of the Miner $\nu$ a collaboration. The  $\nu$  experiments interpretation (e.g. DUNE) would greatly benefit of more accurate and independent AVFF knowledge.

On the other hand, the AVFF is also very important in the picture of the nucleon dynamics degrees of freedom scarcely accessible by electromagnetic probes.

We envisage a direct measurement of the AVFF by means of the inverse  $\beta^-$  decay process  $e^- + p \rightarrow n + \nu$  using an intense and highly polarized beam at Jefferson Lab.

Despite of the extremely low cross section, this would stem from a high time resolution neutron arm and a highly suppressive  $e, \pi$  veto arm and advantage of the helicity flipping of 85% polarized beam, all aiming at a very high enhancement of the S/B ratio.

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