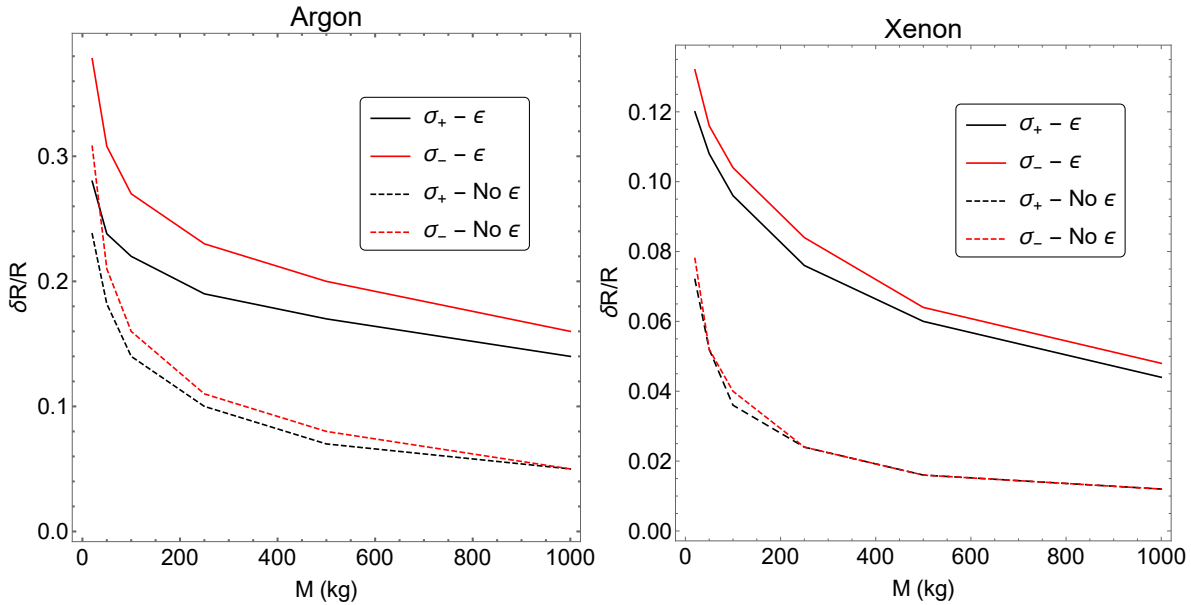
Extracting Nuclear Form Factors from Coherent Neutrino Scattering

Coherent Elastic Neutrino-Nucleus Scattering (CEνNS) : recently first observed by the COHERENT collaboration, using neutrinos from πDAR.

- $(1 - 4\sin^2\theta_w) \simeq 0.045 \Rightarrow$ the proton contribution is suppressed
- From CEνNS it is possible to obtain information on the electroweak form factor and on the neutron distribution.
- Uncertainty on the quenching factor can affect the precision



Expected sensitivity; China Spallation Neutron Source neutrino beam, 1 year lifetime. Helm model used for the neutron distribution

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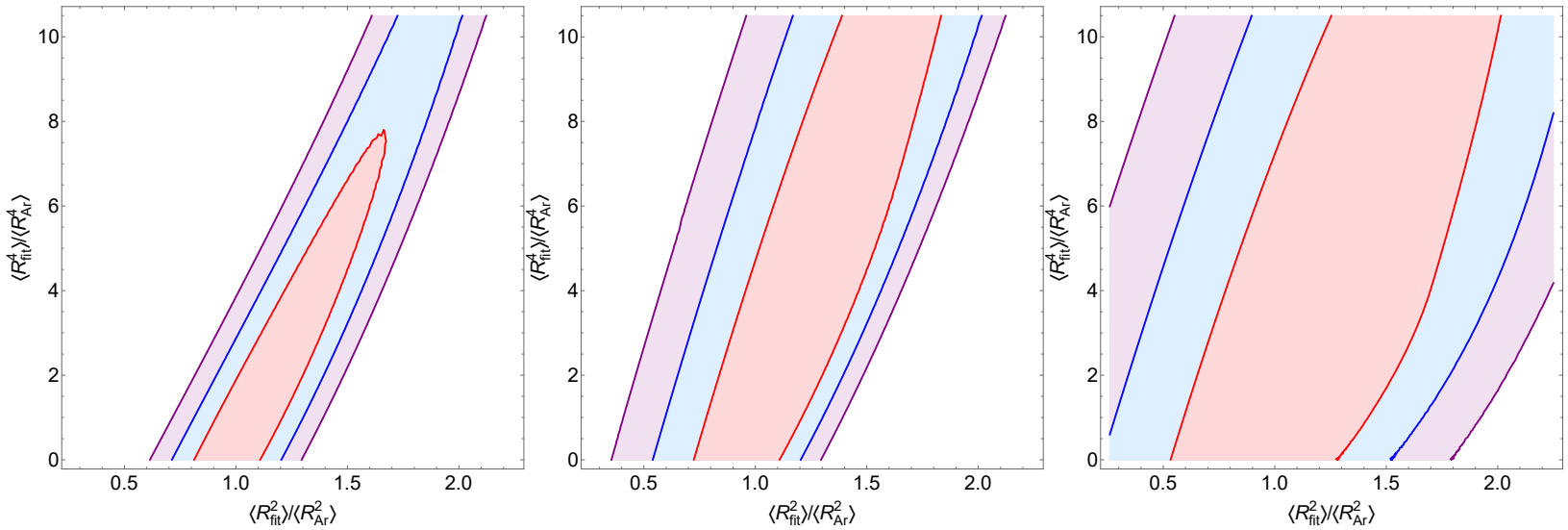
For a model-independent analysis, we considered a Taylor expansion of the form factor, in this way it is possible to estimate the 2n-th momenta of the neutron distribution



1-, 2- and 3-σ's regions in the $\langle R^2\rangle$-$\langle R^4\rangle$ plane.
Left Panel: expansion up to $\langle R^4\rangle$, only pull parameter is the total flux renormalization α. Central Panel: expansion up to $\langle R^6\rangle$ (treated as a pull parameter). Right Panel: Uncertainty on QF taken into account