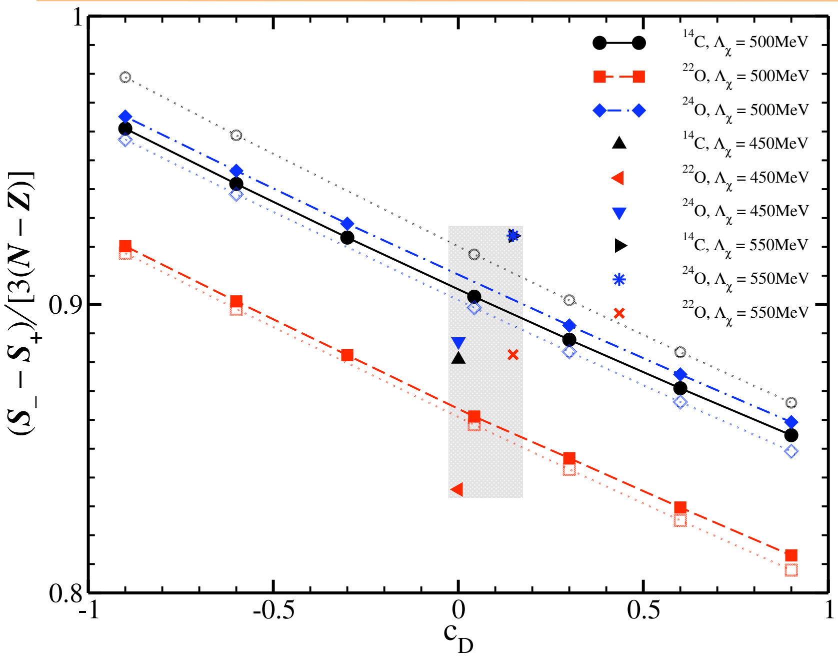
# *Quenching of beta-decay strengths*

## Objectives

- Compute beta decay with state-of-the-art techniques and with consistent treatment of nuclear forces and beta decay transition operators.
- Understand microscopic origin of quenched beta decay strengths in nuclei.
- Revisit our understanding of the anomalous long half life of $^{14}$C.

## Impact

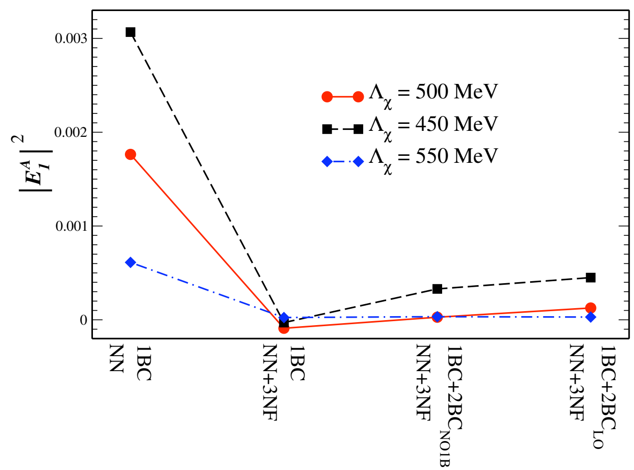
- Nucleon-nucleon and three-nucleon interactions and one-body and two-body currents are key input in *ab initio* nuclear structure computations.
- Long-standing problem of quenched beta-decay strengths.
- Role of two-body currents in beta decay and their contributions to $^{14}$C half life unknown.




*Caption: Ikeda sum rule (measure for beta-decay strength) in $^{14}$C and $^{22,24}$O as a function of a three-body-force parameter. Gray area is region of physical interest, determined by the triton half life. The quenching of 8-16% agrees with measurements in heavier nuclei.*

## Accomplishments

- Quenching of Gamow-Teller strength (as measured by the Ikeda sum rule) by about 8-16% in light nuclei.
- Excitations above 10 MeV yield contributions to beta decay strengths.
- Increase of $^{14}$C half live due to three-nucleon forces countered to some extent by two-body currents.
- Predictions and spin assignments for states in exotic nuclei $^{22,24}$F.




*Caption: Contribution to the beta-decay transition matrix element (ME) in $^{14}$C. Three-nucleon forces (3NF) decrease the ME (resulting in an increased half life) while two-body currents (2BC) counter this decrease to some extent.*

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**Reference**: A. Ekström et al., arXiv:1406.4696

**Contact**: G. Hagen, hageng@ornl.gov