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Status of the b-STILED project

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Precision measurements in beta decay play an essential role in the search for new physics beyond the standard model (SM), by probing "exotic"phenomena such as scalar and tensor interactions. The existence of such interactions induces deviations on specific observables, away from their SM predictions. The study of the full beta energy spectrum offers a sensitive mean to probe these interactions.
The goal of the b-STILED (b: Search of Tensor Interactions in nucLear bEta Decay) is to perform the most precise measurement of the beta-energy spectrum in 6He decay, in order to extract the Fierz interference term b with a precision in the order of 4.10-3. This term depends linearly on exotic coupling constants, allowing to search for or to constrain the presence of tensor interactions in nuclear beta decay.
The main instrumental effect observed in previous measurements of the beta energy spectrum resides in the energy loss due to electrons backscattering outside the detector volume. Two techniques are used to overcome this effect. They consist of using either a very low energy beam of 6He+ ions (25 keV) deposited between two scintillation detectors, or a high energy beam of 6He+ ions (312 MeV) deposited inside one scintillation detector to form a 4π calorimeter. The use of these techniques ensure the deposition of the entire energy of the detected beta particles. An experiment using the first technique was performed at the Grand Accélérateur National d'Ions Lourds (GANIL) in 2021. A second experiment using the other technique was performed at GANIL again in 2023.
This contribution will introduce the general context of the project, describe the second experimental setup, and report on the status of the data analysis for the latest experiment.

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