

## $^{22}\text{Ne}(\alpha,n)^{25}\text{Mg}$ with SHADES

*Friday, 23 February 2024 11:30 (15 minutes)*

The talk is a summary of the characterisation work done for the understanding, calibration and then commissioning of the EJ-309 organic liquid scintillators used by the ERC funded SHADES project lead by prof. Best. A new nuclear astrophysics experiment aiming to perform, for the first time, a direct cross section measurements for the  $^{22}\text{Ne}(\alpha,n)^{25}\text{Mg}$  reaction at very low energy. The SHADES experiment will be held in the deep-underground INFN's facility of LGNS (Gran Sasso –AQ). This will help to minimize the background activity by several orders of magnitude, and therefore, make the collected data of a much higher quality.

SHADES uses a hybrid detection system that consists of a first circular row of organic liquid scintillators surrounded 02 other rows of  $^3\text{He}$  counters. The ingenuity of this system lies in the double role of the scintillators: firstly, as a moderating material, thermalizing high energy neutrons that can't be detected by the  $^3\text{He}$  counters and secondly, the data provided by counters can be time-matched with the one of the liquid scintillators to effectively filtrate "bad" events that can't be emanating from the studied reaction. Moreover, steel-made  $^3\text{He}$  counters have a lower intrinsic radioactivity, which helps to further push the detection precision.

**Primary author:** ANANNA, Chemseddine (Università degli Studi di Napoli "Federico II")

**Presenter:** ANANNA, Chemseddine (Università degli Studi di Napoli "Federico II")

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