

Towards microscopic predictions of cross sections with TALYS

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The increasing need for cross sections far from the valley of stability poses a challenge for nuclear reaction models. So far, predictions of cross sections have relied on more or less phenomenological approaches, depending on parameters adjusted to available experimental data or deduced from systematical relations. While such predictions are expected to be reliable for nuclei not too far from the experimentally known regions, it is clearly preferable to use more fundamental approaches, based on sound physical bases, when dealing with very exotic nuclei. Thanks to the high computer power available today, all the ingredients required to model a nuclear reaction can now be (and have been) microscopically (or semi-microscopically) determined starting from a nucleon-nucleon effective interaction as sole input. We have implemented all these microscopic ingredients in the TALYS nuclear reaction code, and we are now able to perform fully microscopic cross section calculations. We will discuss both the quality of these ingredients and the impact of using them instead of the usually adopted phenomenological parameters.