

## Using alpha-transfer reactions to populate new radioactive isotopes with radioactive beams

*mardi 13 mai 2025 15:20 (20 minutes)*

Alpha-transfer reactions have emerged as a powerful tool for studying excited states in radioactive nuclei, particularly for investigating nuclear species near the stability line that are challenging to produce with sufficient intensity at current radioactive beam facilities. This experimental approach has proven invaluable for characterizing nuclear electric and magnetic moments, validating theoretical models of nuclear-matter behavior near the drip lines, and exploring excited-spin states. The integration of  $\alpha$ -transfer reactions with next-generation high-intensity radioactive beam facilities promises to extend our reach to previously inaccessible nuclear species.

This presentation will examine the application of  $\alpha$ -transfer reactions in nuclear structure studies, featuring the specific case of the  $^{224}\text{Ra}(^{12}\text{C}, ^8\text{Be})^{228}\text{Th}$  reaction at  $\sim 5.5$  MeV/u for investigating low-energy states in  $^{228}\text{Th}$ . We will address current theoretical challenges, showcase experimental results from existing facilities, and discuss future opportunities and technical hurdles in extending this technique to regions further from the stability line. Special emphasis will be placed on the methodological advances required to fully exploit these reactions at upcoming radioactive beam facilities.

**Author:** TORRES, Diego (Universidad Nacional de Colombia)

**Co-auteurs:** M. RAMIREZ, Fitzgerald (Universidad Nacional de Colombia); Prof. O'DONNELL, David (University of the West of Scotland)

**Orateur:** TORRES, Diego (Universidad Nacional de Colombia)

**Classification de Session:** Session 5