



Contribution ID: 10

Type: **not specified**

Delayed gamma-ray spectroscopy as a tool for fusion-fission studies

Thursday, 12 March 2026 18:30 (15 minutes)

Fusion-fission reactions provide valuable insights into nuclear structure and fission dynamics. They are studied with various techniques, including direct mass and charge measurements and gamma-ray spectroscopy. Prompt gamma-ray emission is commonly used, requiring sophisticated detector arrays and coincidence analysis. We present a complementary spectroscopic method based on medium- and long-lived fission products, offering independent verification of fragment yields.

The method exploits delayed gamma radiation from nuclides in fusion-fission and competing channels. Spectra are recorded after irradiation, with target kept in situ or moved to other setup for longer measurements. Absolute yields are determined through decay curve analysis. Success depends on matching measurement timescales to fragment half-lives for separating fission products from fusion-evaporation and activation backgrounds.

Three datasets covering different systems and timescales are presented. ^{215}Fr fission studies [1] demonstrate capability to extract fragment yields comparable to prompt measurements. Analysis of $^{12}\text{C}+^{182}\text{W}$ reaction [2], including medium- and long-lived measurements, shows capabilities and limitations of the method, especially regarding experimental parameters such as measurement length.

Results demonstrate delayed gamma-ray spectroscopy serves as a valuable alternative to classical prompt analysis for fusion-fission studies.

[1] Miernik, K. et al. Fission of ^{215}Fr studied with gamma spectroscopic methods, *Physical Review C* 108, 054608 (2023)

[2] Miernik, K. et al. Gamma spectroscopy of $^{12}\text{C} + ^{182}\text{W}$ fusion-fission reaction (submitted to PRC)

Primary author: GARCZYNSKI, Piotr (Faculty of Physics, University of Warsaw)

Presenter: GARCZYNSKI, Piotr (Faculty of Physics, University of Warsaw)

Session Classification: session 14 (Chair: S. Siem)