

## **TALENT Course 6: Theory for exploring nuclear reaction experiments**

### **Outline project proposal**

**Project name:** Study of highly energetic states of  $^9\text{Be}$  using R-Matrix methodology.

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#### **Project outline and aims:**

Highly energetic states of  $^9\text{Be}$  can be measured through  $^8\text{Li}+p$  reactions like  $^8\text{Li}(p,p)$  and  $^8\text{Li}(p,\alpha)$  above the proton threshold (16.89 MeV). Our goal is to analyse data available for these two reactions to obtain the energies of states and their spins, parities and total and partial widths.

#### **Methodology:**

Some of these highly energetic states of  $^9\text{Be}$  were recently measured through  $^8\text{Li}(p,\alpha)$  reaction between  $E_{cm}=0.2$  and 2.1 MeV [1]. Preliminary data were also acquired through the resonant elastic scattering  $^8\text{Li}(p,p)$  at similar energy range. Both set of data were acquired at RIBRAS System [2] at Pelletron Laboratory, Sao Paulo, Brazil.

A R-Matrix analysis is going to be performed over the cross section data available for both reactions. The “observable” parameters of the R-Matrix obtained in [1] for the  $^8\text{Li}(p,\alpha)$  reaction are going to be used as starting points for the simultaneous analysis of both reaction channels.

#### **Key references:**

1. D. R. Mendes Jr. et al., Phys. Rev. C 86, 064321 (2012).
2. R. Lichtenthaler, et al., Eur. Phys. J. A 25, 733 (2005).