

MEASUREMENT OF THE p -PROCESS BRANCHING POINT REACTION $^{76}\text{Se}(\alpha,\gamma)^{80}\text{Kr}$ IN INVERSE KINEMATICS WITH DRAGON

Jennifer Fallis¹, Charlie Akers^{1,2}, Alison Laird², Artemis Spyrou^{3,4}, Gregory Christian¹, Devin Connolly⁵, Barry Davids^{1,6}, Iris Dillman¹, Ulirke Hager⁵, Patrick O'Malley⁵, Jos Riley², Alex Rojas¹, Chris Ruiz¹, Anna Simon⁷, Stephen Quinn^{3,4}

¹ TRIUMF, Vancouver, BC, Canada

² Department of Physics, University of York, York, United Kingdom

³ Department of Physics and Astronomy, Michigan State University, East Lansing, MI, United States

⁴ National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, MI, United States

⁵ Department of Physics, Colorado School of Mines, Golden, CO, United States

⁶ Department of Physics, Simon Fraser University, Burnaby, BC, Canada

⁷ Department of Physics, University of Richmond, Richmond, VA, United States

The reaction $^{76}\text{Se}(\alpha,\gamma)^{80}\text{Kr}$ has been identified as one of the highest priority measurements for the p -process [1]. The nuclide ^{80}Kr is a branching point of this process and so the relative rates of the ^{80}Kr photo-disintegration reactions will directly affect abundance of p -nuclide ^{78}Kr . Currently the $^{80}\text{Kr}(\gamma,\alpha)^{76}\text{Se}$ reaction rate is the most uncertain. For this reason $^{76}\text{Se}(\alpha,\gamma)^{80}\text{Kr}$ was chosen as the flagship measurement of the DRAGON high mass program, the goal of which has been to expand the capabilities of the DRAGON recoil separator to study beams of mass $A > 40$. The recent measurement of the $^{76}\text{Se}(\alpha,\gamma)^{80}\text{Kr}$ reaction constitutes the first scientific results of this ongoing program. Here we report on the first two measurements of $^{76}\text{Se}(\alpha,\gamma)^{80}\text{Kr}$ at energies within the 2.0 T₉ Gamow window, provide description of the required upgrades to the DRAGON separator, and present results from the high mass commissioning experiments. Plans for future measurements of $^{76}\text{Se}(\alpha,\gamma)^{80}\text{Kr}$ and other p -process reactions will also be discussed.

[1] T. Rauscher, *Phys Rev. C* 73, 015804 (2006)