



Feel free to find me with any questions!

- companion star
- nuclear reaction rates<sup>2</sup>



$$\omega\gamma = \frac{\hbar}{2\tau}(2J_r + 1)B_i(1 - B_i)$$

## **Development of the Solenoid Spectrometer for Nuclear Astrophysics and Decays**

Cade Dembski, Dan Bardayan, Patrick O'Malley, Tan Ahn, Manoel Couder, Anna Simon University of Notre Dame Nuclear Science Lab

## The Solenoid Spectrometer for Nuclear Astrophysics and Decays

- be used to constrain branching ratios!
- $^{19}F(^{3}He, t)^{19}Ne$  for  $^{15}O(\alpha, \gamma)^{19}Ne$
- state
- with radius, period, and position given by

$$r = \frac{mv_{\perp}}{qB} \qquad T_{c_{\perp}}$$

- SSNAPD will be integrated into the first superconducting solenoid (6T) of the TriSol radioactive ion beam facility
- Second and third solenoids are used as a magnetic spectrometer, separating reaction ejectiles of interest
- Construction of electronics, beamline infrastructure, and preliminary testing of detectors is ongoing

Acknowledgments

This work was supported by the NSF under grants numbers: PHY-2011890 & PHY-2310059 & MRI Award # 2117687



• Solenoid spectrometer: array of position-sensitive silicon detectors and target immersed in a ~uniform solenoidal magnetic field - can

• States of interest produced by transfer reactions, e.g.

• Detection of ejectile triton allows for reconstruction of populated

• Subsequent  $\alpha$ -decay particles spiral helically to the magnetic axis

 $2\pi m$  $z = T_{cyc} v_{\parallel}$ 

• Robust separation capabilities and high efficiency allow for background free measurements of low charged-particle branching ratios relevant to explosive astrophysical nucleosynthesis



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