

# Opportunities for Nucleosynthesis Studies with TI-STAR and TIGRESS at ARIEL

*Wednesday, 18 July 2018 14:15 (30 minutes)*

The goal of the TI-STAR (TIGRESS Silicon Tracker Array) project is to build a new tracking silicon detector, combined with an extended gas target that will fit in the TIGRESS gamma detection array at ISAC-II. Different from (active) gas detectors, TI-STAR will use a silicon tracker with an ultra-thin first silicon layer to track the emitted recoiling nuclei.

In this talk we will focus on the future opportunities of TI-STAR and TIGRESS related to explosive nucleosynthesis studies at ARIEL. One main goal of TI-STAR is to use the intense and clean ARIEL beams to study neutron-capture rates in  $A=130$  and  $A=200$  r-process nuclei. The simultaneous measurement of excitation energy (TI-STAR) and gamma ray response (TIGRESS) will allow to deduce the neutron-capture rates for key nuclei along the r-process via the “Oslo” method. Also, precise spectroscopy of exotic, proton-rich nuclei along  $N=Z$  will dramatically improve our understanding of the rp-process. Another topic are indirect studies of low-lying resonance properties in unstable nuclei, relevant to characterize capture rates in the late stages of helium burning in AGB and Wolf-Rayet stars.

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**Session Classification:** R-Process Experiments