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## Preliminary Charged Particle Results from the AlCap Experiment

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Observation of neutrinoless muon-to-electron conversion in the presence of a nucleus would be unambiguous evidence of physics Beyond the Standard Model. Two experiments, COMET at J-PARC and Mu2e at Fermilab, will search for this process in the next few years. These experiments will provide upper-limits on this branching ratio up to 10,000 times better than previously published. To successfully probe unexplored parameter spaces of new physics, COMET/Mu2e will stop a substantial number of muons from high-intensity muon beams while remaining sensitive to a conversion interaction as rare as less than 1 in 10<sup>16</sup> stops. The experiments require precise measurements of Standard Model processes that will be used in COMET/Mu2e for normalization and for understanding backgrounds and noise.

COMET/Mu2e developed a joint venture, the AlCap Experiment, to measure particle emission spectra from muonic interactions in a number of materials. As a major source of damage and background hits in COMET/Mu2e detectors, AlCap measured the charged particle and neutron spectra following nuclear capture on the candidate target materials aluminum and titanium, as well as in a number of structural and shielding materials capable of producing other backgrounds. Additionally, COMET/Mu2e are exploring schemes for determining the number of muon stops via AlCap's measurement of the photon spectra following both atomic and nuclear capture.

AlCap performed three data-taking campaigns between 2013 and 2015 at the Paul Scherrer Institut in Switzerland, each geared towards different measurements, of photon, neutron, and charged particle emission due to interactions of muons stopping in materials. During the final campaign, AlCap collected heavy charged particle data. Preliminary results will be presented of the proton emission spectrum from this data set.

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