



Results and Outlook of The Aluminum Capture Experiment (AlCap)

Saturday 6 August 2016 18:00 (2 hours)

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 coming decade. Barring discovery, these experiments will provide upper-limits on this branching ratio up to 10,000 times better than previously published.

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 background hits in COMET/Mu2e detectors, AlCap sought to measure the charged particle and neutron spectra following nuclear capture on the candidate target materials aluminum and titanium. Additionally, COMET/Mu2e are exploring normalization schemes via AlCap's measurement of the photon spectra following both atomic and nuclear capture.

Over the course of 2013 and 2015, AlCap performed three runs at the Paul Scherrer Institut in Switzerland. The first acquired preliminary data for all spectra, the second run collected only neutron and photon data, and the third primarily charged particle data. Preliminary analyses of the first two runs, already impactful for COMET/Mu2e, is presented along with a summary of the third.

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