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Upgraded PMI diagnostic capabilities using Accelerator-based In-situ Materials Surveillance (AIMS) on Alcator C-Mod LEIGH KESLER, HAROLD BARNARD, ZACHARY HARTWIG, BRANDON SORBOM, RICHARD LANZA, DAVID TERRY, RUI VIEIRA, DENNIS WHYTE, Massachusetts Institute of Technology — The AIMS diagnostic was developed to rapidly and non-invasively characterize *in-situ* plasma material interactions (PMI) in a tokamak. Recent improvements are described which significantly expand this measurement capability on Alcator C-Mod. The detection time at each wall location is reduced from about 10 min to 30 s, via improved hardware and detection geometry. Detectors are in an augmented re-entrant tube to maximize the solid angle between detectors and diagnostic locations. Spatial range is expanded by using beam dynamics simulation to design upgraded B-field power supplies to provide maximal poloidal access, including a $\sim 20^\circ$ toroidal range in the divertor. Measurement accuracy is improved with angular and energy resolved cross section measurements obtained using a separate 0.9 MeV deuteron ion accelerator. Future improvements include the installation of recessed scintillator tiles as beam targets for calibration of the diagnostic. Additionally, implanted depth marker tiles will enable AIMS to observe the in-situ erosion and deposition of high-Z plasma-facing materials. This work is supported by U.S. DOE Grant No. DE-FG02-94ER54235 and Cooperative Agreement No. DE-FC02-99ER54512.

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