Abstract Submitted
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Additive Manufacture (3D Printing) of Plasma Diagnostic Components and Assemblies for Fusion Experiments[1] MORGAN QUINLEY, KATHERINE CHUN, PAUL MELNIK, PAUL SIECK, TREVOR SMITH, JAMES STUBER, SIMON WOODRUFF, Woodruff Scientific Inc, CARLOS ROMERO-TALAMAS, WILLIAM RIVERA, University of Maryland Baltimore County, ALEXANDER CARD, University of Washington — We are investigating the potential impact of additive manufacturing (3D printing) on the cost and complexity of plasma diagnostics. We present a survey of the current state-of-the-art in additive manufacture of metals, as well as the design of diagnostic components that have been optimized for and take advantage of these processes. Included among these is a set of retarding field analyzer probe heads that have been printed in tungsten with internal heat sinks and cooling channels. Finite element analysis of these probe heads shows the potential for a 750K reduction in peak temperature, allowing the probe to take data twice as often without melting. Results of the evaluation of these probe heads for mechanical strength and outgassing, as well as their use on Alcator C-Mod will be presented.

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