Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

**Additive manufacture (3d printing) of plasma diagnostic components and assemblies for fusion experiments**[1] PAUL SIECK, SIMON WOODRUFF, JAMES STUBER, Woodruff Scientific Inc, CARLOS ROMERO-TALAMAS, WILLIAM RIVERA, University of Maryland Baltimore County, SETTHIVOINE YOU, ALEXANDER CARD, University of Washington — Additive manufacturing (or 3D printing) is now becoming sufficiently accurate with a large range of materials for use in printing sensors needed universally in fusion energy research. Decreasing production cost and significantly lowering design time of energy subsystems would realize significant cost reduction for standard diagnostics commonly obtained through research grants. There is now a well-established set of plasma diagnostics, but these expensive since they are often highly complex and require customization, sometimes pace the project. Additive manufacturing (3D printing) is developing rapidly, including open source designs. Basic components can be printed for (in some cases) less than 1/100th costs of conventional manufacturing. We have examined the impact that AM can have on plasma diagnostic cost by taking 15 separate diagnostics through an engineering design using Conventional Manufacturing (CM) techniques to determine costs of components and labor costs associated with getting the diagnostic to work as intended. With that information in hand, we set about optimizing the design to exploit the benefits of AM.

[1]Work performed under DOE Contract DE-SC0011858

Simon Woodruff
Woodruff Scientific Inc

Date submitted: 12 Aug 2015 Electronic form version 1.4