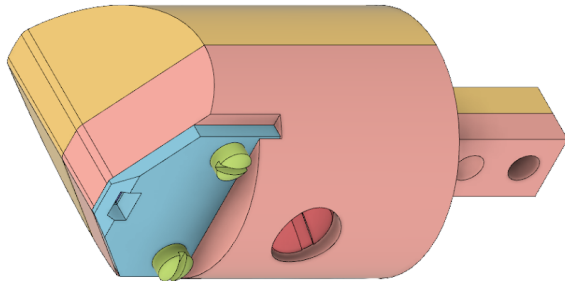


Recent Work in Fusion Plasma Diagnostics

At right is a triple-tip [Langmuir probe](#) designed and fabricated by WSI, capable of measuring electron temperatures from 1 to 70 eV and densities from 10^{14} to 10^{20} m⁻³. It features tungsten tips, a boron nitride plasma-facing surface, and a stainless steel probe arm.



At left is the design of a [retarding field analyzer \(RFA\)](#) probe head currently undergoing fabrication, based on the state-of-the-art design for the Alcator C-Mod edge plasma. These probe heads are used to measure ion and electron temperatures approaching 100 eV in opposing directions, and can withstand heat fluxes up to 400 MW/m².

WSI's Driver/Measurement electronics (shown at right) are used to operate these probes. The box outputs bi-polar or one-sided sine (and other) waveforms at up to 320 V_p and 1 MHz and can measure currents as low as a 5 μA. The electronics can be customized for any fast, high-voltage, low-power application.



WSI is currently developing specification sheets for [many other diagnostics](#) within our capability, from Rogowski Coils to interferometry.

WSI is also currently researching the potential impact of 3D printing in this area. Shown below are prototype designs of 3D printed bolometer baffles, vibration isolators, and monolithic interferometers. At bottom are a set of RFA probe heads printed in tungsten and use at Alcator C-Mod (APS poster [here](#), RSI in progress).

