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Miniature magnetic field probes for use in high temperature plasmas K.E. MILLER, K.M. VELAS, D.E. LOTZ, University of Washington, Redmond Plasma Physics Laboratory — An ideal internal magnetic probe would provide high temporal and spatial resolution, without perturbing the plasma. Optimizing the following moves towards this ideal: Size - as small as possible; Plasma facing material - insulating, difficult to ablate, low Z; Shielding - electrostatic, short field penetration time; Electronics - high gain integration, long term stability. Over the years, significant improvements in these areas have been made. The latest probe, built for TCSU, is 3 axis with 96 windings. It is BN clad with a 6 mm outside diameter, is UHV compatible, and can be baked to 200 C. The integrators used are gated, with a 10 usec RC time, and have less then a 10 mV drift per second. Plasmas with widely varying parameters have been probed. A few hundred eV, 1e20 m-3 density plasma with a 1 msec duration represents a reasonable upper limit for probe usability. Plasma duration, density, and temperature can be traded for each other. Design criterion and construction details will be presented, with a focus on the "how to" of actually building one.

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