Equilibrium Reconstruction in Stellarators: V3FIT JOHN
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Ridge National Laboratory — Equilibrium reconstruction is a crucial capability in
the interpretation of tokamak experiments. As stellarator plasma beta or bootstrap
currents increase, the configuration of flux surfaces deviates further from that of the
vacuum. As a result, there has been a growing need in the stellarator community
for a fast, flexible, and easy-to-modify reconstruction code that can be used to de-
termine the 3-D equilibrium state. We have been developing the V3FIT equilibrium
reconstruction code in response to this need. Recently, a significant milestone was
achieved with the implementation of the V3FIT interferometry/polarimetry diagnos-
tic module, which uses line-integrated quantities to reconstruct both plasma density
and magnetic field profiles. This module is not machine-specific, it can accomodate
any number of diagnostic beams in virtually any configuration, and it provides data
that is both independent and complementary to the information provided by the
previously existing magnetic diagnostics module. The implementation of these two
important modules has allowed us to begin to shift our focus to the designing of the
tightly-coupled algorithms that are expected to be the key to V3FIT's speed and
efficiency.

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