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An Optical Diagnostic for Electric-Field Measurements of ICRF

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— The interaction of the near-field of Ion Cyclotron Range of Frequency (ICRF) antenna and the edge plasma can lead to undesirable effects such as unipolar arcing and localized regions of high parallel heat flux. In order to mitigate these effects, while launching the required megawatts of ICRF power across the scrape off layer, control of this nonlinear interaction must be achieved. Currently, a diagnostic utilizing optical emission spectroscopy is under development that will be capable of experimentally determining the magnitude of the rectified and RF electric field associated with ICRF antenna near-field. The physical principle behind the diagnostic is the dynamic Stark effect where the RF electric field associated with the ICRF wave allows for multi-photon processes to occur. The electric field parameters can then be extracted from the resulting spectral line profile.

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