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Integrated, Reactor Relevant Solutions for Lower Hybrid Range of Frequencies Actuators[1] S SHIRAIWA, P. T. BONOLI, Y LIN, G. M. WALLACE, S. J. WUKITCH, PSFC, MIT — RF (radiofrequency) actuators with high system efficiency (wall-plug to plasma) and ability for continuous operation have long be recognized as essential tools for realizing a steady state tokamak. A number of physics and technological challenges to utilization remain including current drive efficiency and location, efficient coupling, and impurity contamination. In a reactor environment, plasma material interaction (PMI) issues associated with coupling structures are similar to the first wall and have been identified as a potential show-stopper. High field side (HFS) launch of LHRF power represents an integrated solution that both improves core wave physics and mitigates PMI/coupling issues. For HFS LHRF, wave penetration is vastly improves because wave accessibility scales as 1/B allowing for launching the wave at lower $n_{||}$ (parallel refractive index). The lower $n_{||}$ penetrate to higher electron temperature resulting in higher current drive efficiency ($1/n_{||}^2$). HFS RF launch also provides for a means to dramatically improve launcher robustness in a reactor environment. On the HFS, the SOL is quiescent; local density profile is steep and controlled through magnetic shape; fast particle, neutron, turbulent heat and particle fluxes are eliminated or minim

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