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Control of Internal Transport Barriers in Magnetically Confined Fusion Plasmas[1] SOMA PANTA, DAVID NEWMAN, Univ. of Alaska Fairbanks, RAUL SANCHEZ, Univ. Carlos III de Madrid, PAUL TERRY, Univ of Wisconsin-Madison — In magnetic confinement fusion devices the best performance often involves some sort of transport barriers to reduce the energy and particle flow from core to edge. Those barriers create gradients in the temperature and density profiles. If gradients in the profiles are too steep that can lead to instabilities and the system collapses. Control of these barriers is therefore an important challenge for fusion devices (burning plasmas). In this work we focus on the dynamics of internal transport barriers. Using a simple 7 field transport model, extensively used for barrier dynamics and control studies, we explore the use of RF heating to control the local gradients and therefore the growth rates and shearing rates for barrier initiation and control in self-heated fusion plasmas. Ion channel barriers can be formed in self-heated plasmas with some NBI heating but electron channel barriers are very sensitive. They can be formed in self-heated plasmas with additional auxiliary heating i.e. NBI and radio-frequency(RF). Using RF heating on both electrons and ions at proper locations, electron channel barriers along with ion channel barriers can be formed and removed demonstrating a control technique. Investigating the role of pellet injection in controlling the barriers is our next goal.

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