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Quantification of Detonation Augmentation by Secondary Waves in a Rotating Detonation Combustor[1] FABIAN CHACON, MIRKO GAMBA, University of Michigan — In this work we will investigate the system of waves present in a laboratory scale rotating detonation combustor (RDC). These devices are of scientific interest because of the theoretical efficiency gain that can be achieved through the utilization of these devices in a jet engine or other conventional combustor. However, the flow fields within RDCs are complex and not fully understood, nor are many of the mechanisms behind some of the phenomena associated with a RDC. One such phenomena is termed secondary waves: waves (apart from detonation) which have some associated pressure oscillation, chemical reactions, or both travelling at a consistent speed while the combustor is under operation. In particular, we will use a newly developed analysis technique that allows for the quantification of spatial distributions of pressure throughout the operation of the RDC. This will allow for determining the impact that the secondary wave has on the pressure rise of the detonation wave when they collide in the channel. Understanding how significant the impact of these collisions are, will allow for greater understanding of the role these secondary waves will play into the operability and stability of a RDC and its integration into a practical system.

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