Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

The flow field in a rotating detonation-wave engine[1] KAZHIKATHRA KAILASANATH, DOUGLAS SCHWER, Naval Research Laboratory — Rotating detonation-wave engines (RDE) are a form of continuous detonation-wave engine. They potentially provide further gains than an intermittent or pulsed detonation–wave engine (PDE). However, significantly less work has been on this concept when compared to the PDE. In this talk, we present the detailed flow field in an idealized RDE, primarily consisting of two concentric cylinders. A premixed detonable mixture is injected into the annulus between the two concentric cylinders. Once a detonation is initiated, it keeps travelling around in the annulus as long as there is fresh detonable mixture ahead of it. Hence, the injection process is critically important to the stability and performance of the RDE. Furthermore, we show that the flow field is quite complex consisting of multiple shock waves and the outflow is primarily axial, although the detonation-wave is travelling around circumferentially.

[1]Sponsored by the NRL 6.1 Computational Physics Task Area.

Kazhikathra Kailasanath
Naval Research Laboratory

Date submitted: 12 Aug 2011 Electronic form version 1.4