Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Fully coupled plasma, flow and combustion modeling of nanosecond pulsed discharge for combustion ignition . ASHISH SHARMA, VIVEK SUBRAMANIAM, EVRIM SOLMAZ, LAXMINARAYAN RAJA, Univ of Texas, Austin — We perform computational studies on a nanosecond pulsed plasma induced flame ignition for an H_2 - air mixture under high pressure conditions. The non-equilibrium plasma model is based on a self-consistent, multi-species, multi-temperature continuum description of the plasma while the flow model is based on the reactive compressible Euler equations. The goal of the current work is to 1) Study the formation of combustion-enhancing active species radicals O, OH and H during the plasma evolution phase 2) Study the influence of active reactive species O, OH and H on flame ignition of a H_2 – air mixture and 3) Consistently resolve plasma induced flame ignition using a fully coupled plasma –reactive compressible flow model. We perform 1D and 2D simulations to identify the parameters governing the plasma evolution for successful flame ignition.

Ashish Sharma
Univ of Texas, Austin

Date submitted: 18 Jun 2018 Electronic form version 1.4