NASA HBCU Renewable Energy and Technology Utilization Project (NHRETU)
and
2. Center for the Study of Terrestrial and Extraterrestrial Atmospheres
(CSTEA)).

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Experimental characterization of a small custom-built double-acting gamma-type stirling engine.[1] PETER INTSIFUL, Prairie View A M University,Prairie View, TX, FRANCIS MENSAH, Virginia Union University, Richmond, VA, ARTHUR THORPE, Howard University, Washington, DC — This paper investigates characterization of a small custom-built double-acting gamma-type stirling engine. Stirling-cycle engine is a reciprocating energy conversion machine with working spaces operating under conditions of oscillating pressure and flow. These conditions may be due to compressibility as wells as pressure and temperature fluctuations. In standard literature, research indicates that there is lack of basic physics to account for the transport phenomena that manifest themselves in the working spaces of reciprocating engines. Previous techniques involve governing equations: mass, momentum and energy. Some authors use engineering thermodynamics. None of these approaches addresses this particular engine. A technique for observing and analyzing the behavior of this engine via parametric spectral profiles has been developed, using laser beams. These profiles enabled the generation of pv-curves and other trajectories for investigating the thermos-physical and thermos-hydrodynamic phenomena that manifest in the exchangers. The engine's performance was examined. The results indicate that with current load of 35.78A, electric power of 0.505 kW was generated at a speed of 240 rpm and 29.50 percent efficiency was obtained.

[1]NASA grants to Howard University NASA/HBCU-NHRETU CSTEA

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Date submitted: 24 Nov 2015 Electronic form version 1.4