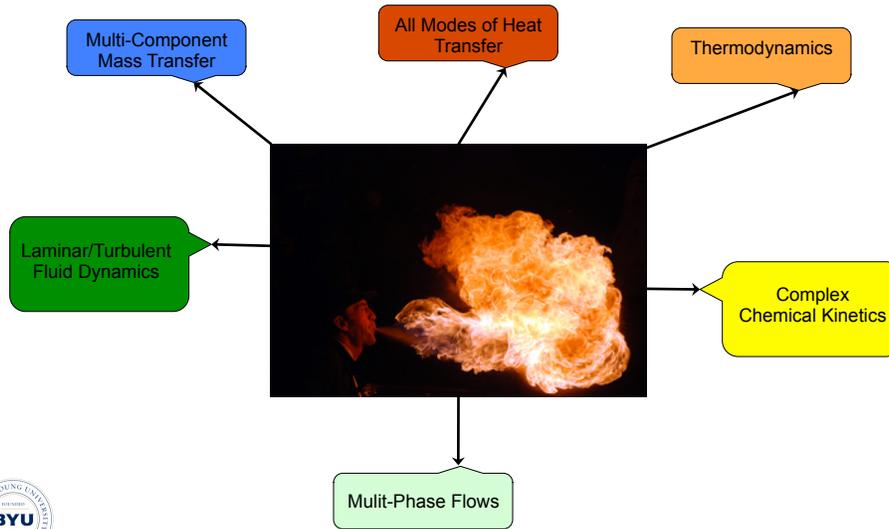


Combustion Physics

3

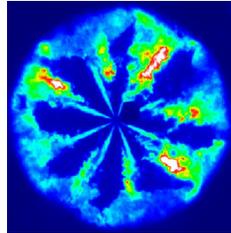


Fuels

4

Mostly Hydrocarbons, all three Phases

- Gas (natural gas, light hydrocarbons)
- Liquid (diesel, gasoline)
- Solid (Coal, Biomass)



Pollutants

5

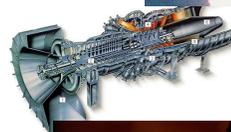
- NO_x
- SO_x
- P.M.
 - Soot
 - Ash
- Metals
- Unburnt HC's



Applications

6

- Heating
 - Furnaces
 - Boilers
 - Stoves
 - Process Heat
- Power/Electric
 - Coal PP
 - Gas Turbines
- Military/Space
 - Rockets, Missiles
- Hazards
 - Fires
 - Explosions
 - Detonations
- Transportation
 - Turbines
 - Engines
- Other
 - Catalytic combustion
 - Metal combustion, particle synthesis



What is combustion?

7

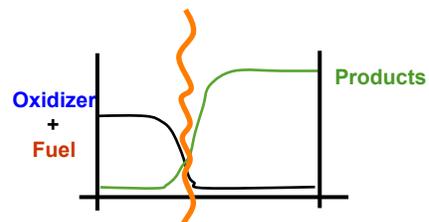
- What is combustion?
- How can we define it?
- What are its properties and characteristics?
- How do we know something is combustion and when it is not?



Premixed and Nonpremixed Flames

8

Premixed



Nonpremixed

