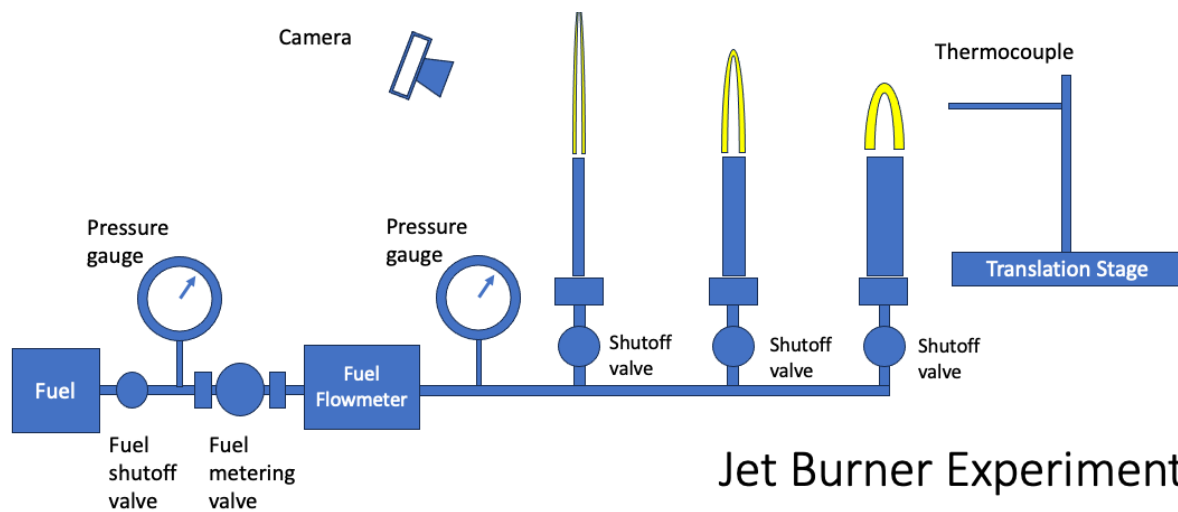


UCI CI-SS Laboratory Exercise

Jet Flame – flame height

The jet flame is a classic configuration that can be run in premixed, non-premixed, inverse, or partially premixed flame modes depending on what is fed to the fuel flow jet and what is in the atmosphere surrounding the burner. The main difference between the jet flame and the coflow flame is that self-generated flow (jet momentum and buoyancy) is responsible for the mixing of fuel and oxidizer. This experiment is using the jet burner in standard non-premixed mode where the jet is fuel (propane) and the surroundings are atmospheric air. This flame is then a candle flame without the phase change of solid to gaseous fuel. Under some flow conditions this flame will be turbulent but we will try to stay at low flow conditions for laminar jet flames. This experiment is to establish a steady nonpremixed jet flame on 3 different diameters of fuel tube (at the same flow rate) and to determine the flame height in each case. It is also possible to probe the thermal structure of that flame with a thermocouple. The flame will be visualized using its



chemiluminescence (CH^* primarily) and soot incandescence, and the thermal gradients (if there is time) will be visualized using shadowgraph imaging. As seen in the graphic, this experiment just brushes the surface of this important canonical flame. In keeping with the research theme, the tasks are not rigidly defined but are designed to encourage exploration within the parameters of the various components.