Stationary power generating gas turbines are held to strict emissions standards which limits efficiency and power output. Dry low NOx combustors are being designed to limit NOx emissions while simultaneously improving efficiency. Axially staged combustors are leveraged to reduce emissions by staging heat release into separate stages. This is done by moving some fuel and air to a downstream reacting jet-in-crossflow. In this stage, the residence time is decreased allowing for optimal turbine inlet temperatures without the unwanted emissions. The current thesis focuses on how the downstream flame is affected by crossflow and pressure changes. The experimental facility consists of a vitiator which provides vitiated crossflow at various conditions for the axial stage. Downstream of the vitiator is the test section which consists of 3 optical viewing ports for imaging diagnostics and an interchangeable injector plate to study different jet geometries. CH* chemiluminescence is used to visualize flame behavior, and a Horiba gas analyzer is used to obtain emissions measurements for various run conditions.

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The public is welcome to attend.