SELF EXCITED OSCILLATIONS OF IMPINGING PLANAR JETS

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High speed impinging gas jets are widely used in many industrial applications such as the production of pulp and paper, the production of glass sheets and polymer films, as well as in coating control applications and high performance heat transfer applications. In addition, similar geometries often occur in valves and piping system components, and in other confined geometries. These flows are known to be liable to the production of strong flow oscillations and the production of intense acoustic tones. These oscillations can be strong sources of noise pollution and can couple with mechanical modes and lead to fatigue failure, and can limit the usefulness of these geometries in many applications. The flow oscillations and acoustic tones are generated due to and interaction between the instabilities in the jets free shear layer, which develop to form large scale coherent structures, and pressure fluctuations produced by the impingement of these structures at the impingement surface. The resulting feedback mechanism produces a series of “locked-on” acoustic tones with large amplitudes. This seminar will focus on the impinging planar jet geometry and will characterize the behavior of this system, with a discussion of recent experimental measurements which have been performed at McMaster University in Canada. In addition, the seminar will include a discussion of ongoing work being performed at EDF on numerical simulations of this geometry using code_Safari.