Preparation of Papers for AIAA Technical Journals

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Here we present a shock structure tracking technique and detailed discussion on the fluid dynamics of transient supersonic jets. We explore the fundamental fluid dynamics of transient supersonic jets with variation of the exit flow nozzle geometry and plate impingement. Our nozzle geometries include a convergent, divergent, and convergent-divergent design. The impingement of transient supersonic jets has previously been studied, however it is absent of extensive data, high quality schlieren, and variable exit geometry. We aim to address absences in the literature, explore in detail the shock-vortex interaction during jet impingement, and track the progression of the shock structure with a novel algorithm. Our discussion of the fundamental fluid dynamics governing the transient supersonic jet process details the affects of alternating the incident Mach number for, nozzle geometry variation on the shock-vortex interaction and jet plate impingement.

Nomenclature

(Nomenclature entries should have the units identified)

A = **amplitude of oscillation**

a = **cylinder diameter**

C_p = **pressure coefficient**

Cx = **force coefficient in the *x* direction**

Cy = **force coefficient in the *y* direction**

c = **chord**

dt = **time step**

Fx = X **component of the resultant pressure force acting on the vehicle**

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Fy = **Y component of the resultant pressure force acting on the vehicle**

f, g = **generic functions**

h = **height**

i = **time index during navigation**

j = **waypoint index**

K = **trailing-edge (TE) nondimensional angular deflection rate**

Θ = **boundary-layer momentum thickness**

ρ = **density**

Subscripts

cg = **center of gravity**

G = **generator body**

iso = **waypoint index**

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Table 1 Transitions selected for thermometry

Line	Transition v''		J''	Frequency, cm^{-1}	FJ, cm^{-1}	Gv, cm^{-1}
a	0	P_{12}	2.5	44069.416	73.58	948.66
b	1	R_2	2.5	42229.348	73.41	2824.76
c	2	R_{21}	805	40562.179	71.37	4672.68
d	0	R_2	23.5	42516.527	1045.85	948.76

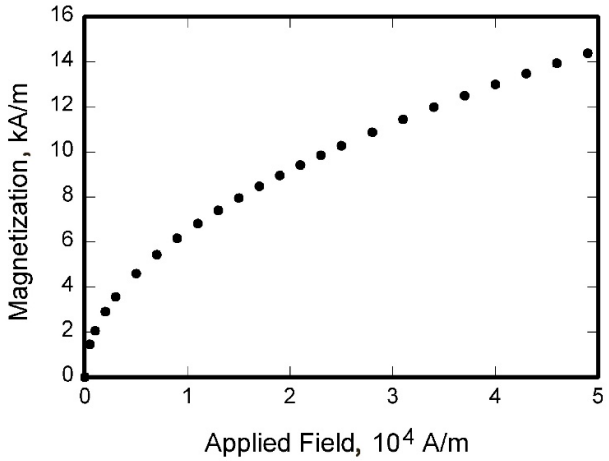

Fig. 1 Magnetization as a function of applied fields.

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$$\int_0^{r_2} F(r,\varphi)\mathrm{d}r\,\mathrm{d}\varphi = [\sigma r_2/(2\mu_0)]\int_0^{\infty} \exp(-\lambda|z_j - z_i|)\lambda^{-1}J_1(\lambda r_2)J_0(\lambda r_i\,\lambda\mathrm{d}\lambda) \tag{1}$$

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Use only one space after periods or colons. Hyphenate complex modifiers: "zero-field-cooled magnetization." Insert a zero before decimal points: "0.25," not ".25." Use "cm^2" not "cc."

A parenthetical statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within parenthesis.) Use American, not English, spellings (e.g., "color," not "colour"). The serial comma is preferred: "A, B, and C" instead of "A, B and C."

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